

## Workshop Manual

Octavia II 2004 ➤

Octavia II 2010 ➤

**2.0/110; 147 kW FSI engine**

|           |     |     |     |     |     |     |     |  |  |
|-----------|-----|-----|-----|-----|-----|-----|-----|--|--|
| Engine ID | BLR | BLX | BLY | BVX | BVY | BVZ | BWA |  |  |
|-----------|-----|-----|-----|-----|-----|-----|-----|--|--|

Edition 05.2016

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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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## 00 – Technical data

### 1 Technical data

(SRL000957; Edition 05.2016)

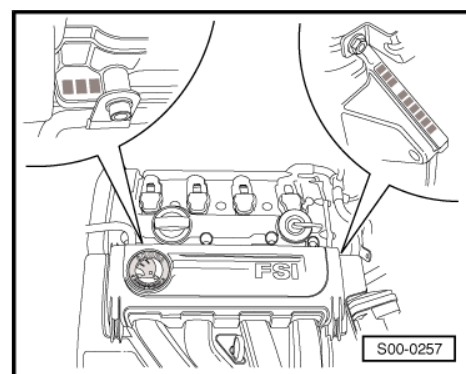
#### 1.1 Engine number

The engine identification characters and engine number are located to the left of the engine/gearbox joint.

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ**

The engine identification characters are in addition type-punched at the cylinder head.

**Vehicles with engine identification characters BWA**



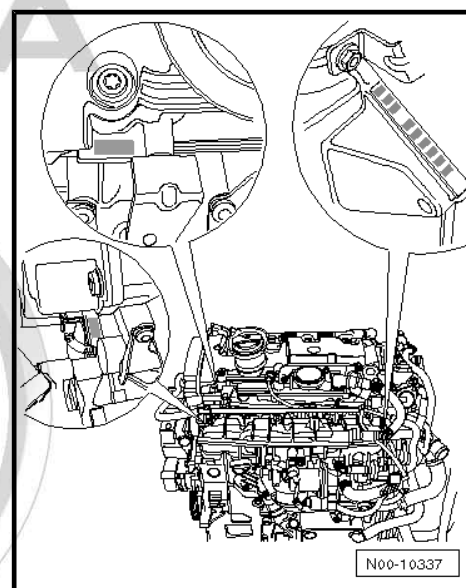
The engine identification characters are in addition type-punched at the cylinder head on the right and at the cylinder block.

**Continued for all vehicles**

The engine number consists of up to nine digits (alphanumeric). The first part represents the "engine code" (a maximum of 3 identification letters), the second part the "serial number". If more than 999.999 engines with the same engine code were produced then the first digit of the six part section will be replaced by a letter.

In addition, a sticker with the "engine identification characters" and "serial number" is affixed to the timing belt guard.

The engine identification characters are also indicated on the vehicle data sticker.



#### 1.2 Engine characteristics

| Identification code                | BLR           | BLX           | BLY           |
|------------------------------------|---------------|---------------|---------------|
| Manufactured                       | 11.04 ➤ 10.05 | 11.04 ➤ 10.05 | 11.04 ➤ 10.05 |
| Exhaust limit values conforming to | EU-4          | EU-4          | EU-2          |
| Displacement cm <sup>3</sup>       | 1984          | 1984          | 1984          |
| Power output kW at rpm             | 110/6000      | 110/6000      | 110/5800      |
| Torque Nm at rpm                   | 200/3500      | 200/3500      | 200/3500      |
| Bore Ø mm                          | 82,5          | 82,5          | 82,5          |
| Stroke mm                          | 92,8          | 92,8          | 92,8          |
| Compression ratio                  | 11,5:1        | 11,5:1        | 10,5:1        |
| Cylinder / valves per cylinder     | 4/4           | 4/4           | 4/4           |



| Identification code               | BLR                       | BLX                       | BLY                       |
|-----------------------------------|---------------------------|---------------------------|---------------------------|
| RON                               | unleaded 98 <sup>1)</sup> | unleaded 98 <sup>1)</sup> | unleaded 95 <sup>2)</sup> |
| Ignition system, fuel injection   | Motronic MED 9.5          | Motronic MED 9.5          | Motronic MED 9.5          |
| Type of fuel preparation          | homogeneous               | homogeneous/layered       | homogeneous               |
| Knock control                     | 2 sensors                 | 2 sensors                 | 2 sensors                 |
| Lambda control                    | 5 probes                  | 4 probes                  | 2 probes                  |
| Three-way catalytic converter     | yes                       | yes                       | yes                       |
| NO <sub>x</sub> storage converter | no                        | yes                       | no                        |
| Exhaust gas recirculation         | yes                       | yes                       | no                        |
| Intake manifold change-over       | yes                       | yes                       | yes                       |
| Camshaft adjustment               | yes                       | yes                       | yes                       |
| Exhaust gas turbocharger          | no                        | no                        | no                        |
| Balancing shaft module            | yes                       | yes                       | yes                       |

<sup>1)</sup> At least 95 RON in exceptional cases, although engine output is reduced

<sup>2)</sup> At least 91 RON in exceptional cases, although engine output is reduced

| Identification code                | BVX                       | BVY                       | BVZ                       |
|------------------------------------|---------------------------|---------------------------|---------------------------|
| Manufactured                       | 11.05 ► 11.08             | 11.05 ► 11.08             | 11.05 ► 11.08             |
| Exhaust limit values conforming to | EU-4                      | EU-4                      | EU-2                      |
| Displacement cm <sup>3</sup>       | 1984                      | 1984                      | 1984                      |
| Power output kW at rpm             | 110/6000                  | 110/6000                  | 110/5800                  |
| Torque Nm at rpm                   | 200/3500                  | 200/3500                  | 200/3500                  |
| Bore Ø mm                          | 82,5                      | 82,5                      | 82,5                      |
| Stroke mm                          | 92,8                      | 92,8                      | 92,8                      |
| Compression ratio                  | 11,5:1                    | 11,5:1                    | 10,5:1                    |
| Cylinder / valves per cylinder     | 4/4                       | 4/4                       | 4/4                       |
| RON                                | unleaded 98 <sup>1)</sup> | unleaded 98 <sup>1)</sup> | unleaded 95 <sup>2)</sup> |
| Ignition system, fuel injection    | Motronic MED 9.5          | Motronic MED 9.5          | Motronic MED 9.5          |
| Type of fuel preparation           | homogeneous/layered       | homogeneous               | homogeneous               |
| Knock control                      | 2 sensors                 | 2 sensors                 | 2 sensors                 |
| Lambda control                     | 4 probes                  | 4 probes                  | 2 probes                  |
| Three-way catalytic converter      | yes                       | yes                       | yes                       |
| NO <sub>x</sub> storage converter  | yes                       | no                        | no                        |
| Exhaust gas recirculation          | yes                       | yes                       | no                        |
| Intake manifold change-over        | yes                       | yes                       | yes                       |
| Camshaft adjustment                | yes                       | yes                       | yes                       |
| Exhaust gas turbocharger           | no                        | no                        | no                        |
| Balancing shaft module             | yes                       | yes                       | yes                       |

<sup>1)</sup> At least 95 RON in exceptional cases, although engine output is reduced

<sup>2)</sup> At least 91 RON in exceptional cases, although engine output is reduced

| Identification code                | BWA                       |  |  |
|------------------------------------|---------------------------|--|--|
| Manufactured                       | 10.05 ▶ 11.08             |  |  |
| Exhaust limit values conforming to | EU-4                      |  |  |
| Displacement                       | cm <sup>3</sup> 1984      |  |  |
| Power output                       | kW at rpm 147/5700        |  |  |
| Torque                             | Nm at rpm 280/2000        |  |  |
| Bore                               | Ø mm 82,5                 |  |  |
| Stroke                             | mm 92,8                   |  |  |
| Compression ratio                  | 10,5:1                    |  |  |
| Cylinder / valves per cylinder     | 4/4                       |  |  |
| RON                                | unleaded 98 <sup>1)</sup> |  |  |
| Ignition system, fuel injection    | Motronic MED 9.1          |  |  |
| Type of fuel preparation           | homogeneous               |  |  |
| Knock control                      | 2 sensors                 |  |  |
| Lambda control                     | 2 probes                  |  |  |
| Three-way catalytic converter      | yes                       |  |  |
| Exhaust gas recirculation          | no                        |  |  |
| Intake manifold change-over        | yes                       |  |  |
| Camshaft adjustment                | yes                       |  |  |
| Exhaust gas turbocharger           | yes                       |  |  |
| Balancing shaft module             | yes                       |  |  |

<sup>1)</sup> At least 95 RON in exceptional cases, although engine output is reduced



## 01 – Self-diagnosis

### 1 Self diagnosis, safety measures, cleanliness regulations, directions

#### 1.1 Self-diagnosis

This Rep.-Gr. is deleted.

For this use the "Vehicle self-diagnosis", "Measuring method" and "Fault finding" ⇒ Vehicle diagnostic tester.

#### 1.2 Safety precautions when working on fuel supply system



##### WARNING

- ◆ *The safety measures for the pressure reduction in the high pressure system must be observed ⇒ [page 5](#).*
- ◆ *Fuel supply line is pressurised! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place a clean cleaning cloth around the connection point before detaching wiring. Reduce pressure by carefully removing the wiring.*

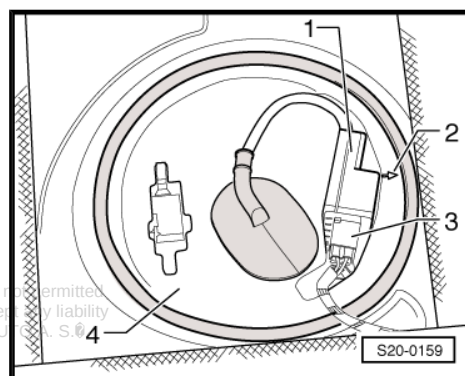
- ◆ Fuel pump is activated by switching on ignition and via driver door contact switch. Before opening the fuel system and for reasons of safety, if the battery is not disconnected, the plug -arrow- must be disconnected from the fuel pump control unit.



##### Caution

*When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:*

- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, the active charcoal container-unit, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*



When removing and installing the fuel gauge sender or the fuel delivery unit from a full or partly filled fuel tank, pay attention to the following points:

- ◆ The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly opening of the fuel tank in order to extract the released fuel vapours, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m<sup>3</sup>/h must be used.
- ◆ Avoid skin contact with fuel!
- ◆ Wear fuel-resistant gloves!

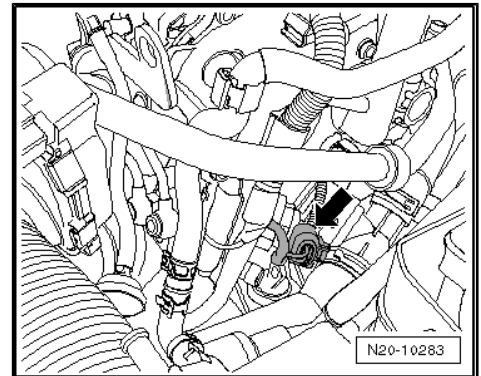
### 1.3 Reduce pressure in the high-pressure system



#### WARNING

- ◆ *The injection system consists of a high pressure part (max. pressure of 12 MPa = 120 bar) and a low pressure part (pressure of approx. 0.6 MPa = 6 bar).*
- ◆ *Before opening the high pressure system, e.g. removing the high pressure pump, the fuel distributor, the injection valves, the fuel pipes or the fuel pressure sender - G247-, the fuel pressure in the high pressure system with a remaining pressure of approx. 0.6 MPa (6 bar) must be reduced. The procedure for this is described below.*

- Disconnect the plug from the fuel pressure regulating valve - N276- on the high-pressure pump -arrow-.

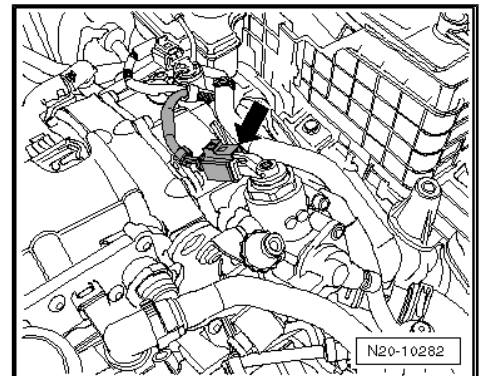


- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ
- ◆ Vehicles with engine identification characters BWA
- Allow the engine to run for approx. 10 seconds at idling speed.



#### Note

- ◆ *When the connector is removed from the fuel pressure regulating valve - N276- in idling mode, the pressure lowers in the high-pressure part to approx. 0.6 MPa (6 bar).*
- ◆ *After high pressure depressurisation, the high-pressure system must be opened as the fuel pressure increases again due to heating.*
- Switch off ignition.







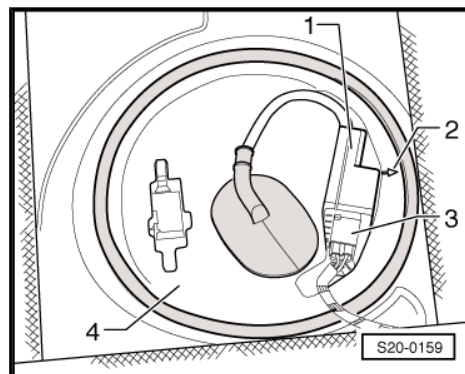
- For safety reasons, before opening the fuel system you must disconnect the plug from the fuel pump control unit -arrow-.



#### WARNING

**The fuel lines are pressurized! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Before opening the high pressure system, lay cleaning cloths around the connection point.**

- Now lay a clean cleaning cloth around the connection point and carefully open it up, in order to reduce the remaining pressure of approx 0.6 MPa (6 bar). Collect the fuel which flows out.



#### Note

- ◆ Interrogate the event memory of the engine control unit at the end of the following work and delete all the event memory entries.
- ◆ The readiness code must be generated if the event memory has been cleared ⇒ Vehicle diagnostic tester.

## 1.4 Rules of cleanliness to observe when working on the fuel supply system

Carefully observe the following five rules for cleanliness when working on the fuel supply/injection system:

- ◆ Thoroughly clean the connection points and their surroundings before releasing.
- ◆ Place removed parts on a clean surface and cover. Use lint-free cloths!
- ◆ Carefully cover or close opened components if the repair is not completed immediately.
- ◆ Only install clean parts: Only unpack replacement parts immediately prior to fitting. Do not use any parts which have been stored unwrapped (e.g. in tool boxes).
- ◆ When the system is open: Avoid using compressed air when-  
ever possible. Avoid moving the vehicle

## 1.5 Safety measures to apply when working on the fuel injection and ignition system



#### WARNING

- ◆ The safety measures for the pressure reduction in the high pressure system must be observed ⇒ [page 5](#).
- ◆ Fuel supply line is pressurised! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place a clean cleaning cloth around the connection point before detaching wiring. Reduce pressure by carefully removing the wiring.

Observe the following points to prevent injury to persons and/or damage to the injection and ignition system:



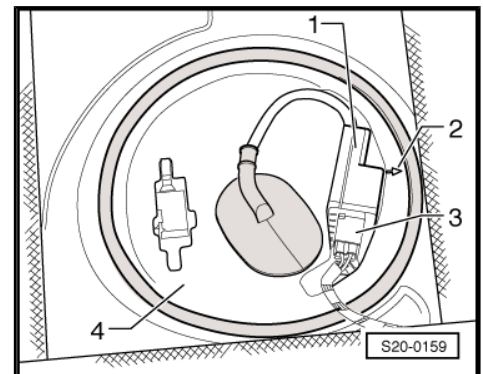
- ◆ Do not touch or remove ignition leads and ignition coils with power output stages with the engine running or at start speed.
- ◆ Ignition must be switched off before disconnecting and re-connecting the cables of the fuel injection and the ignition system as well as of the test equipment.
- ◆ If the engine must be operated at start speed without it starting, as for example, when checking the compression pressure, open lid of fuse carrier in the engine compartment and unplug fuse for Motronic current supply relay - J271- ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- ◆ Fuel pump is activated by switching on ignition and via driver door contact switch. Before opening the fuel system and for reasons of safety, if the battery is not disconnected, the plug-arrow- must be disconnected from the fuel pump control unit.



#### Caution

***When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:***

- ◆ ***Lay lines of all kinds (e.g. for fuel, hydraulic fluid, the active charcoal container-unit, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.***
- ◆ ***In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.***



If test and measuring devices are required during test drives observe the following:

- ◆ Always secure the test and measuring devices on the rear seat and have a second person operate them there.
- ◆ If the test and measuring devices are operated from the passenger seat, the passenger could be injured by the release of the passenger airbag in the event of an accident.

## 1.6 General notes on the injection system

Repairing ignition ➔ [page 293](#) .

- ◆ The engine control unit is equipped with a self-diagnosis system. Before repairs and also for fault finding, first of all interrogate the event memory. Also check the vacuum hoses and connections (unmetered air).
- ◆ Fuel hoses in the engine compartment must only be secured with spring-type clips ➔ electronic catalogue of original parts . The use of clamp-type or screw-type clips is not allowed.
- ◆ A minimum voltage of 11.5 V is required for perfect functioning of the electrical components.
- ◆ Do not use sealants containing silicone. Traces of silicone elements drawn in by the engine are not burnt in the engine and damage the lambda probe.
- ◆ If after fault finding, repair or inspection of components the engine starts briefly and then stops, it is possible that the immobiliser blocks the engine control unit. Then if necessary the control unit must be adapted ➔ Vehicle diagnostic tester.
- ◆ When opening the driver door the fuel pump is activated for 2 seconds in order to build up the pressure in the fuel system.
- ◆ Certain inspections may cause the control unit to detect and store a fault. It is therefore necessary to interrogate the event



memory after having completed all inspections and repairs,  
and if necessary delete ⇒ Vehicle diagnostic tester.

Safety measures ⇒ [page 6](#) .

## 1.7 General notes on the ignition system

- ◆ Switch off the ignition before disconnecting and connecting the battery, as this may damage the engine control unit.
- ◆ The engine control unit is equipped with self-diagnosis; inspect ⇒ Vehicle diagnostic tester.
- ◆ A minimum voltage of 11.5 V is required for perfect functioning of the electrical components.
- ◆ Certain inspections may cause the control unit to detect and store a fault. It is therefore necessary to interrogate the event memory after having completed all inspections and repairs, and if necessary delete ⇒ Vehicle diagnostic tester.
- ◆ If after fault finding, repair or inspection of components the engine starts briefly and then stops, it is possible that the immobiliser blocks the engine control unit. Then if necessary the control unit must be adapted ⇒ Vehicle diagnostic tester.

Safety measures ⇒ [page 6](#) .

Test data, spark-plugs ⇒ Maintenance ; Booklet Octavia II

## 1.8 General instructions for charge air system



### WARNING

*When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:*

- ◆ Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.
- ◆ Ensure that there is adequate free access to all moving or hot components.



### Caution

*In case a mechanical damage to the exhaust gas turbocharger is found, e.g. damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:*

- ◆ Clean all oil lines.
- ◆ Change engine oil and oil filter.
- ◆ Inspect the air filter housing, the air filter element and the intake hoses for contaminations.
- ◆ Inspect the whole charge-air routing and the charge air cooler for foreign bodies.

*If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.*

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- ◆ The charge-air system must be tight.
- ◆ Replace self-locking nuts.
- ◆ Hose connections and hoses for the charge air system must be free of oil and grease before being installed. Only gaskets and sealing surfaces of the push-fit couplings are coated with oil ⇒ [page 216](#) .
- ◆ Assembly of hose connections with push-fit couplings ⇒ [page 216](#) .
- ◆ Observe markings on the hoses and components.
- ◆ Only install approved clamps for securing the hose connections ⇒ Electronic Catalogue of Original Parts .
- ◆ Spring-type clip pliers are recommended for installation of spring-type clips.
- ◆ Before screwing down the oil feed line, fill the exhaust turbocharger via the connection fitting with engine oil.
- ◆ To ensure the oil supply to the exhaust gas turbocharger, leave the engine running for about 1 minute after installing the exhaust gas turbocharger.

## 1.9 Additional instructions when undertaking assembly work on the air-conditioning system



### WARNING

*Do not open the refrigerant circuit of the air conditioning system.*



### Note

*In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.*

Steps which should be taken in order to remove and install the engine without opening the refrigerant circuit:

- Remove the holding clamp(s) of the coolant lines.
- Remove AC compressor from the bracket ⇒ [page 33](#) .
- Mount the AC compressor in such a way that the refrigerant lines/hoses are not under tension.



## 10 – Removing and installing engine

### 1 Removing engine

#### Special tools and workshop equipment required

- ◆ Engine and gearbox jack . e.g. -V.A.G 1383 A-
- ◆ Double ladder , e. g. -VAS 5085-
- ◆ Engine bracket - T10012-
- ◆ Pliers for spring strap clamps
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Grease - G 000 100-
- ◆ Cable strap

#### 1.1 Removing engine

- Enquire the event memories of all control units prior to engine removal ⇒ Vehicle diagnostic tester.



#### Note

- ◆ *The engine is removed downwards together with the gearbox.*
- ◆ *All cable straps that have been loosened or cut open when the engine was removed must be attached again in the same location when the engine is installed again.*



#### Caution

**When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:**

- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, the active charcoal container-unit, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*

Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ [page 4](#) .



#### WARNING

**Relieve pressure in the high pressure system ⇒ [page 5](#) .**

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**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**

- Pull off engine cover upwards at the sides.

**Vehicles with engine identification characters BWA**

- Remove engine cover ⇒ [page 242](#) .

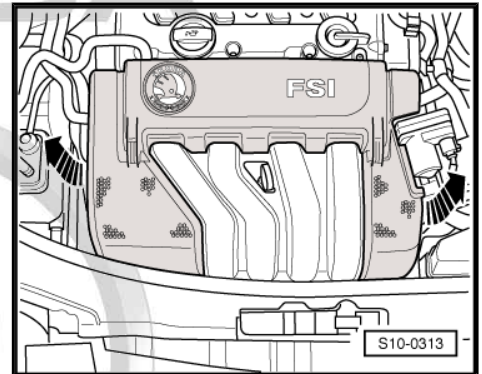
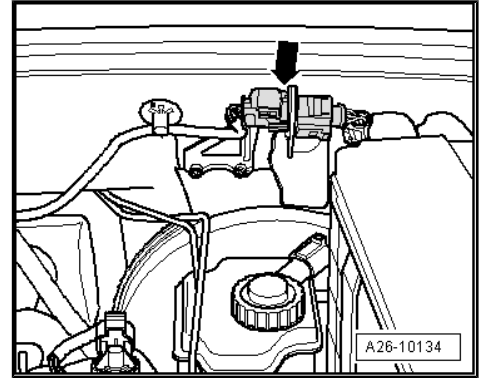
- Take plug connection -arrow- for lambda probe upstream of catalytic converter out of the holder, disconnect and move wiring loom clear.

#### Continued for all vehicles

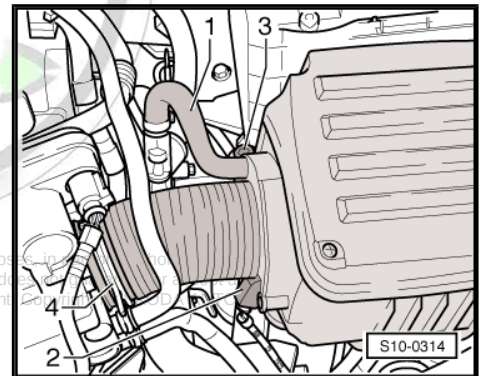
- Before disconnecting the battery, if necessary remove the adapter for the anti-theft wheel bolts from the luggage compartment.
- Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .
- Drain coolant ⇒ [page 149](#) .
- Remove drive shaft to the right ⇒ Chassis; Rep. gr. 40 .
- Unscrew left drive shaft from the flange shaft of the gearbox and tie up.
- Disconnect the coolant hoses from the radiator, heat exchanger and expansion reservoir.

#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ

- Pull off engine cover upwards at the sides -arrows-.



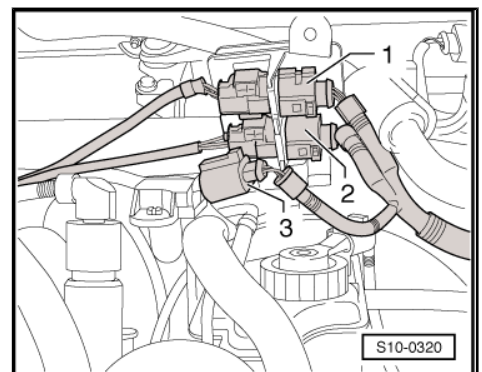
- Disconnect hose -1- and plug -2- from air filter housing.
- Unscrew bolt -3-.
- Disconnect air guide hose -4- from the throttle valve control unit. To do so, open the spring-type clip with spring-type clip pliers .
- Remove air filter.
- Disconnect air guide hose to the container with pre-cubic contents from lock carrier.



- Take plug connection -1- for lambda probe 2 upstream of catalytic converter - G108- out of the holder and disconnect.
- Take plug connection -2- for lambda probe upstream of catalytic converter - G39- out of the holder and disconnect.
- Disconnect Plug connection -3- for brake servo pressure sensor - G294- .

#### Continued for all vehicles

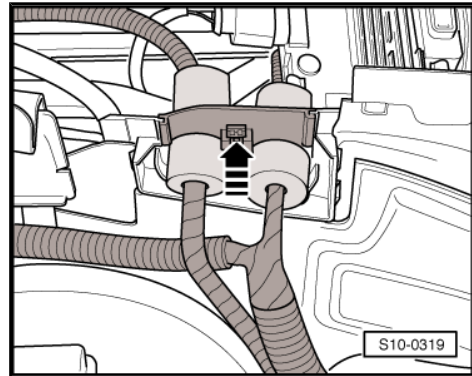
- Disconnect the plug of the engine wiring harness from the engine control unit ⇒ [page 268](#) .



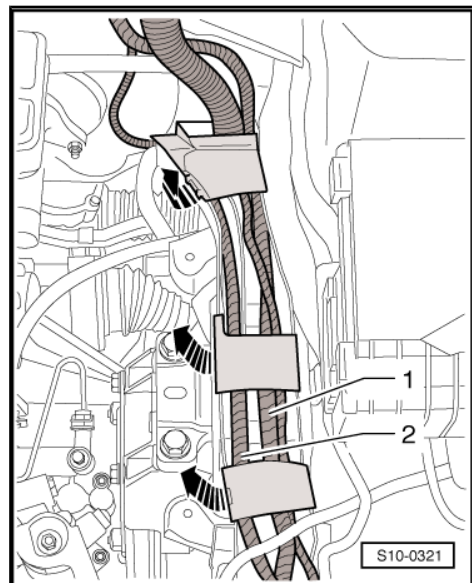




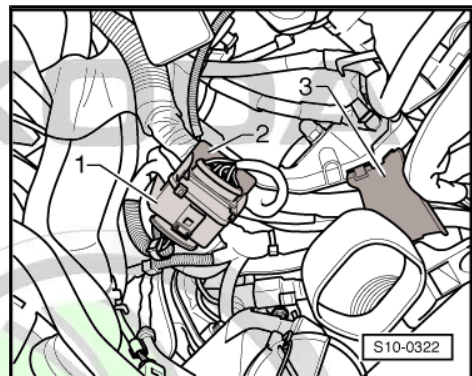
- Release duct for engine wiring harness -arrow- and pull out upwards.
- Expose the left engine wiring harness at the rear on the bulk-head plenum chamber.



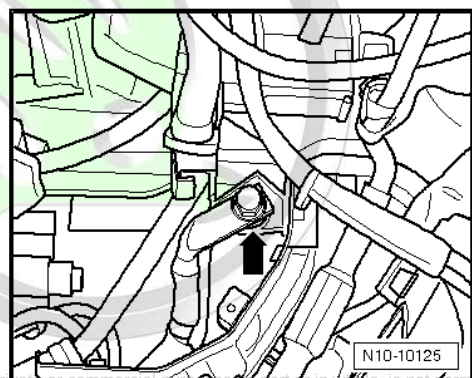
- Open the mounting bracket on the wiring -arrows-.
- Take engine wiring harness for control unit -1- out of the cable guide.



- Open brackets -2- and -3- of the cable guide.
- Move front left plug connection -1- clear of the wiring harness and disconnect it.
- Take engine wiring harness for control unit out of the cable guide.
- Disconnect all connectors for the engine wiring harness/body-shell and place the engine wiring harness down onto the engine.
- Remove protective collar from the starter.



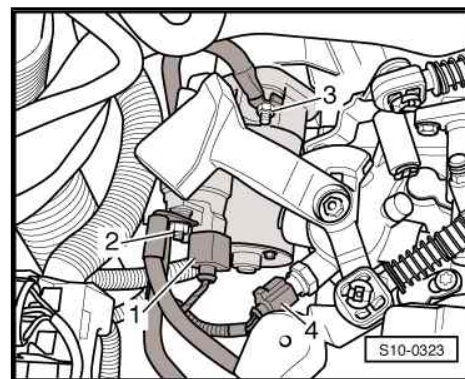
- Unbolt earth cable -arrow- from the frame side rail.





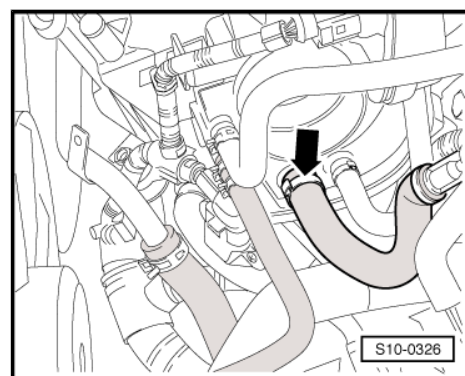
- Disconnect the plug connection -4- for the reversing light switch.
- Unscrew earth wire -3-.
- Detach cables -1- and -2- at starter.
- Move the cables out of the way.

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ**



- Disconnect the vacuum hose -arrow- from the brake servo at the intake manifold.

**Vehicles with engine identification characters BWA**



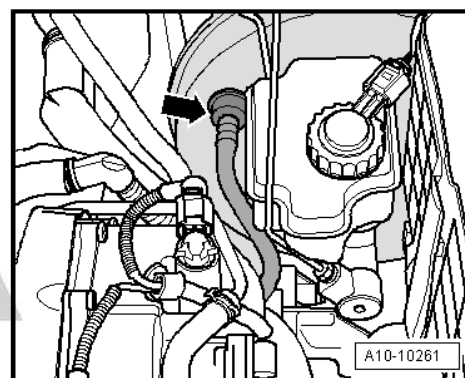
- Detach the vacuum hose -arrow- from the brake servo unit.

**Vehicles with automatic gearbox 09G (AQ 250)**

- Remove the selector lever control cable from the gearbox ⇒ Gearbox; Rep. gr. 37 .

**Vehicles fitted with manual gearbox 02S (MQ 250)**

- Remove the shift and selector cable from the gearbox ⇒ Gearbox; Rep. gr. 34 .





- Remove strut -1-.
- Remove slave cylinder -arrows- and tie up on side, do not open the wiring system.



### Caution

*After removing the slave cylinder, do not depress the clutch pedal. Doing so may damage the slave cylinder.*

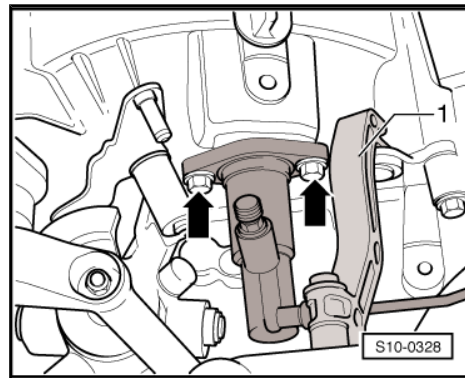
### Vehicles fitted with manual gearbox 02Q (MQ 350)

- Remove the shift and selector cable from the gearbox ⇒ Gearbox; Rep. gr. 34 .
- Remove pressure line from breather/slave cylinder ⇒ Gearbox; Rep. gr. 34 .



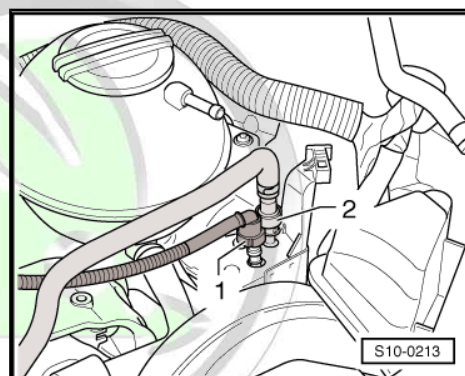
### Caution

*After removing the slave cylinder, do not depress the clutch pedal.*



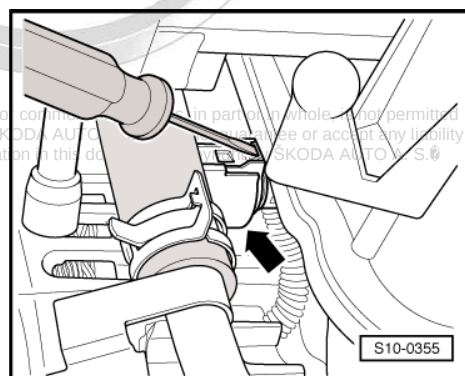
### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

- Disconnect fuel feed line -2- (press in the circlip).

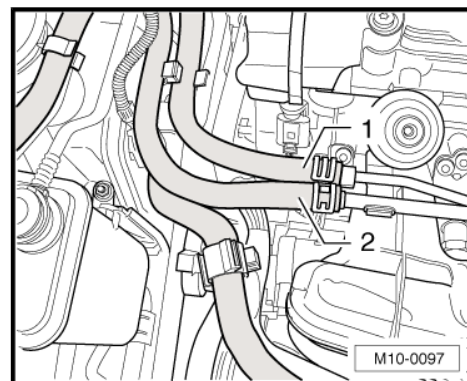


- Release plug connection on alternator -arrow-.
- Push plug off alternator with a screwdriver.

### Vehicles with engine identification characters BWA

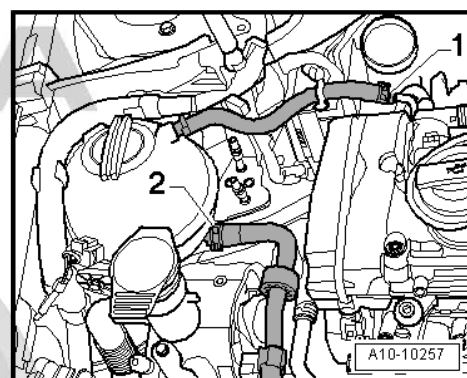


- Mark hoses -1- and -2- and disconnect from the lines.

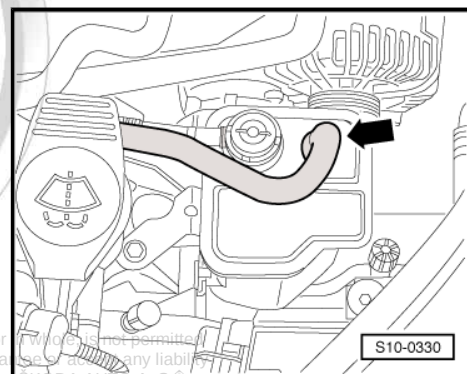


- Remove the coolant hoses -1- and -2- .

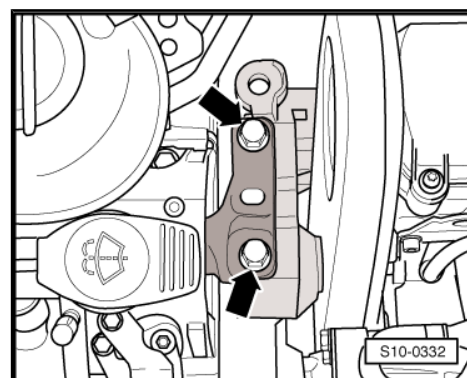
Continued for all vehicles



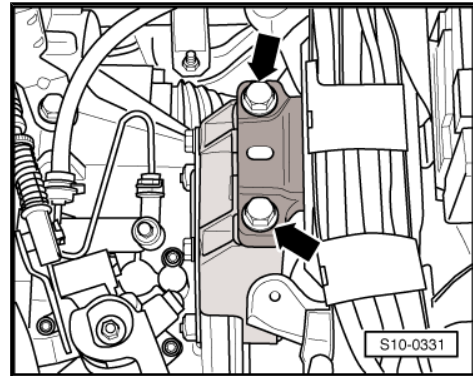
- Disconnect the hose -arrow- from the activated charcoal filter.
- Pull activated charcoal filter upwards out of the mounting.



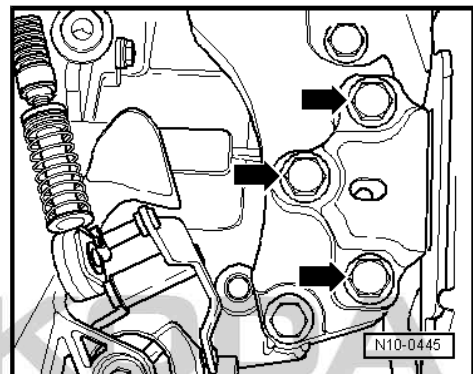
- Slightly loosen the screws -arrows- of the assembly bracket at the engine (less than 1 revolution).
- Slightly loosen the screws -arrows- of the assembly bracket at the gearbox (less than 1 revolution).



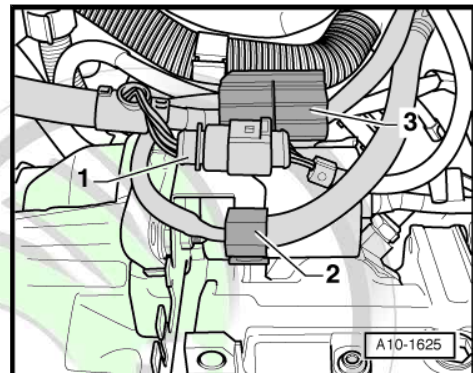
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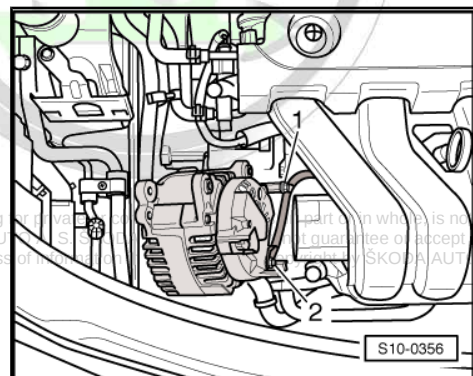
- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ
- ◆ Vehicles with engine identification characters BWA



- Separate electrical plug connection -1-.
- Open cable holders -2- and -3- and move the cables out of the way.



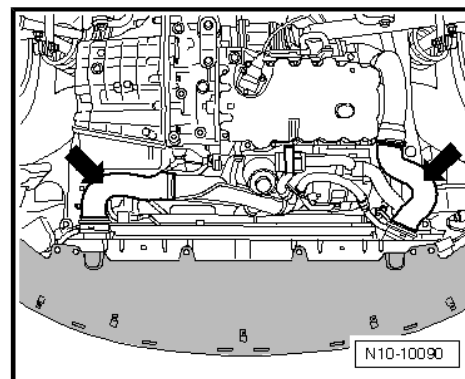
- Unscrew the nut -1- and remove the clamp on the alternator.
- Remove the protective cap from the nut -2-.
- Unscrew the nut -2- and pull of the cable.
- Remove the front part of the left wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
- Put lock carrier in service position ⇒ Body Work; Rep. gr. 50 .



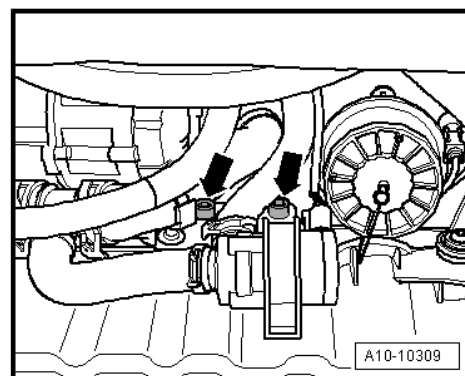
#### Vehicles with engine identification characters BWA



- Remove charge air hoses -arrows-.



- Detach the bracket for the coolant recirculation pump - V51- -arrows- and disconnect the plug.



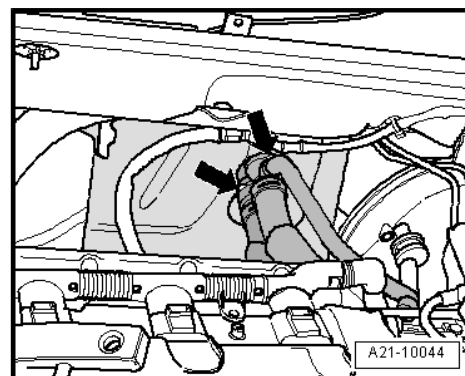
- Detach the coolant hoses -arrows- for the heat exchanger for the bulkhead heater.

Vehicles with air conditioning

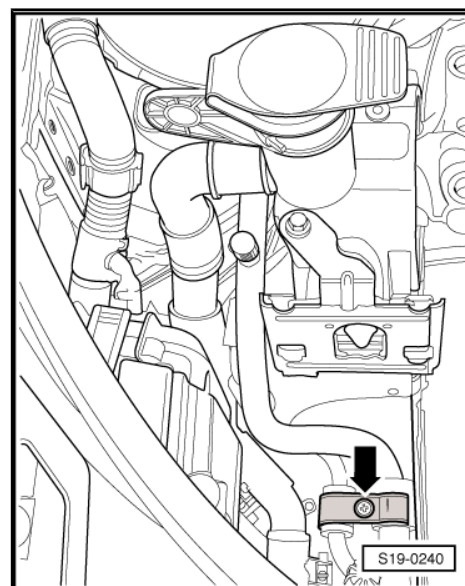


#### WARNING

**Do not open the refrigerant circuit of the air conditioning system.**



- Detach the bracket -arrow- for the refrigerant lines on the right frame side rail.
- On vehicles with engine identification characters BWA, remove the fan shroud with radiator fans ➔ [page 158](#) .
- Remove V-ribbed belt ➔ [page 39](#) .







- Disconnect the plug -1- for the magnetic coupling on the AC compressor.



**Note**

*In order to avoid damage to the AC compressor as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.*

- Release screws -arrows- for AC compressor.

Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

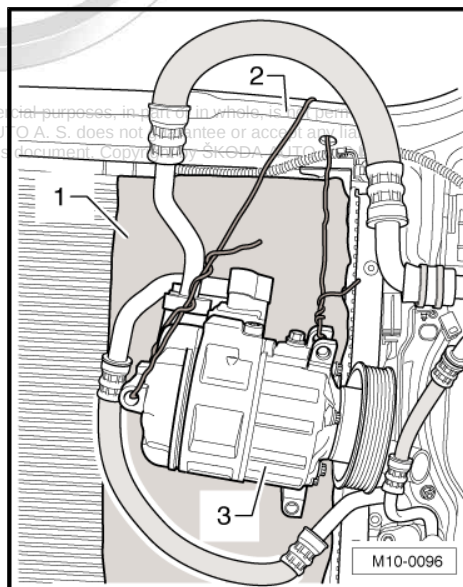
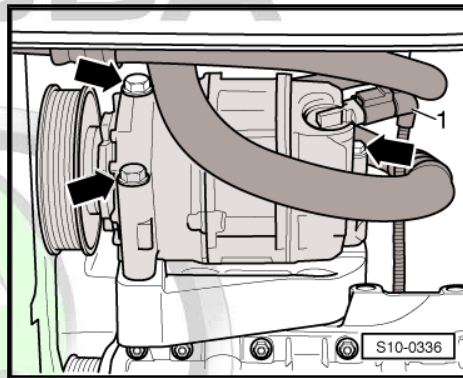
- Tie AC compressor -3- to the bottom of the lock carrier with connected refrigerant hoses.

Vehicles with engine identification characters BWA

- Secure AC compressor -3- to the lock carrier -2- as shown. Attach cardboard -1- to the radiator to protect the radiator.

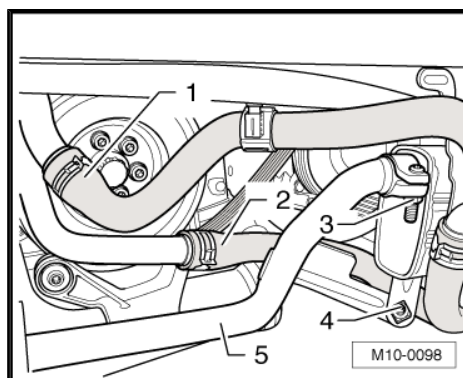
**Vehicles with auxiliary heating.**

- Place a catch pan - VAS 6208 - under the engine.

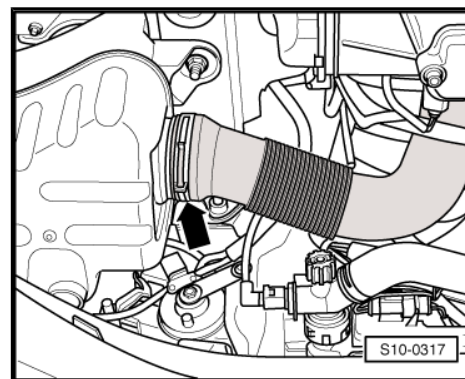


- Remove the coolant hoses -1- and -2- .
- Unscrew the screw -4-, undo the nut -3- and remove the exhaust pipe -5- of the auxiliary heating.

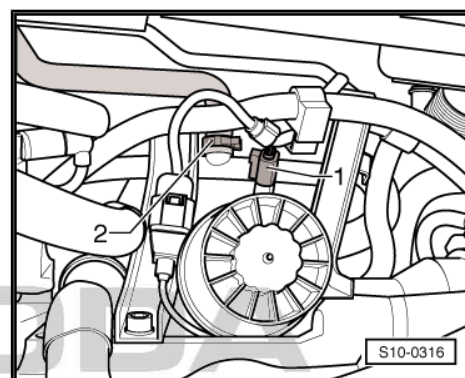
Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ



- Pull off air guide hose -arrow- at the bottom of the container with pre-cubic contents. To do so, open the spring-type clip with spring-type clip pliers .
- Detach and remove the air guide hose from the bracket.

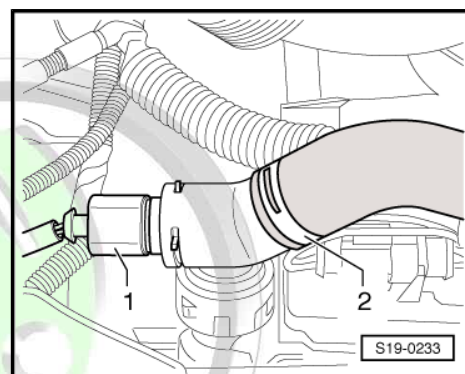


- Disconnect plug -1- at oil pressure switch - F1- .
- If present, disconnect the plug connection on the oil level and oil temperature sensor - G266- on the oil pan.

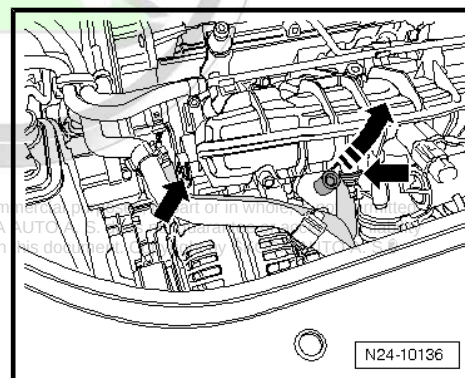


- Disconnect plug connection -1-.
- Remove pre-exhaust pipe ➔ [page 284](#) .

**Vehicles with engine identification characters BWA**



- Unscrew the bolt for the coolant pipe and the nut for the dipstick discharge -arrows- out of the intake manifold. Pull the dipstick discharge -arrow- upwards off the engine.



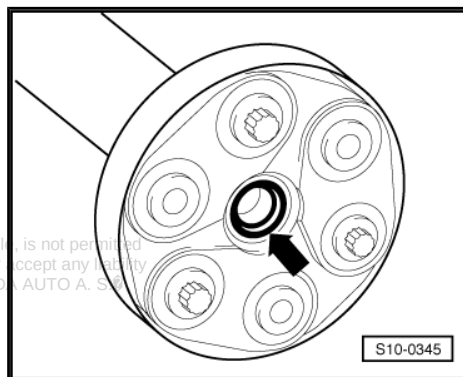
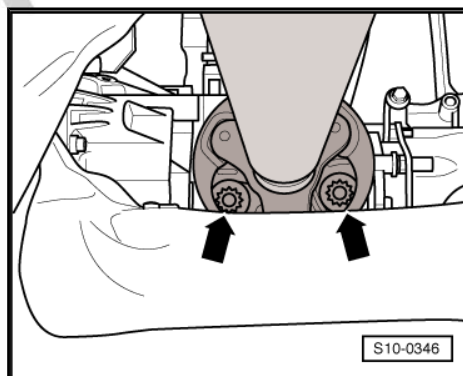
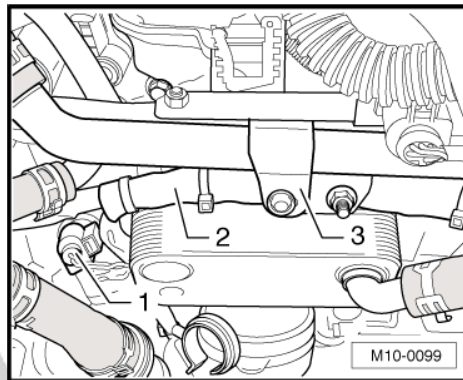
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- Disconnect plug -1- from the coolant temperature sender at radiator outlet - G83- .
- Move line -2- behind the coolant pipe -3- out of the way.
- Remove throttle flap control unit - J338- ➔ [page 257](#) .
- Remove the intake air temperature sensor - G42- ( ➔ [page 235](#) , Pos. 23).
- Disconnect the plug from the turbocharger divert air valve - N249- .
- Remove pre-exhaust pipe ➔ [page 286](#) .

#### Vehicles with four-wheel drive

- Remove propshaft from angle gearbox -arrows-. The third bolt is not visible in the illustration.



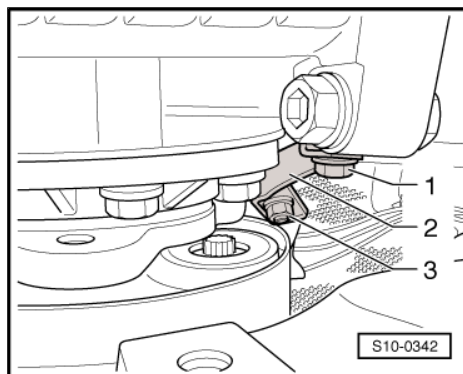
#### Note

- ◆ When removing, do not damage the sealing ring -arrow- of the propshaft.
- ◆ If the sealing ring -arrow- is damaged, the propshaft must be replaced.

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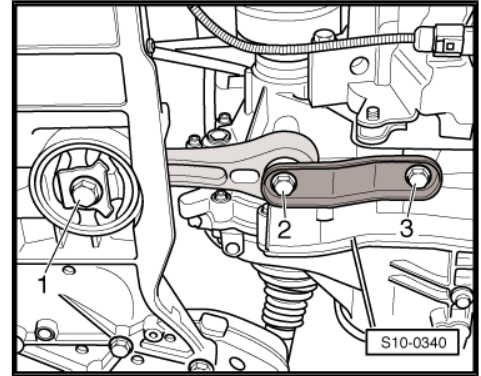
- Unscrew screw -1- on gearbox.
- Unscrew the securing nuts -3- (total of 6) of the front section of the exhaust system/exhaust manifold.
- Remove left strut -2- for exhaust manifold.

#### Continued for all vehicles



- First, unscrew the screw -1-.
- Then unscrew screws -2- and -3- and remove the pendulum support.

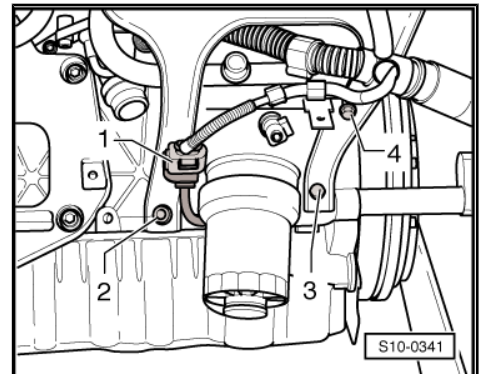
**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ**



- Take plug connections -1- out of the holder and disconnect.
- Unscrew screws -2-, -3- and -4-.

**Continued for all vehicles**

- Remove/unclamp all other necessary electrical cables from the engine/gearbox unit, and expose them.
- Unclamp all connecting, coolant, vacuum and suction hoses from the engine.

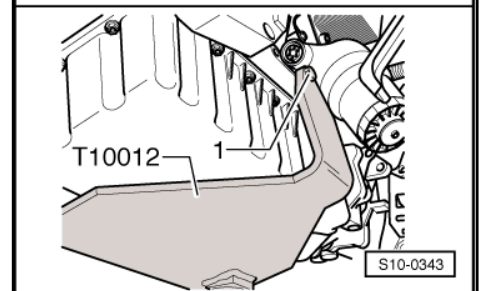
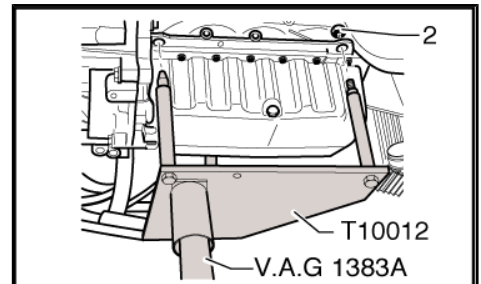


- Screw engine mount - T10012- to the cylinder block with nut -2- and securing bolt -1- at 20 Nm.
- Insert engine/gearbox jack - V.A.G 1383 A- in the engine mount - T10012- and raise slightly.

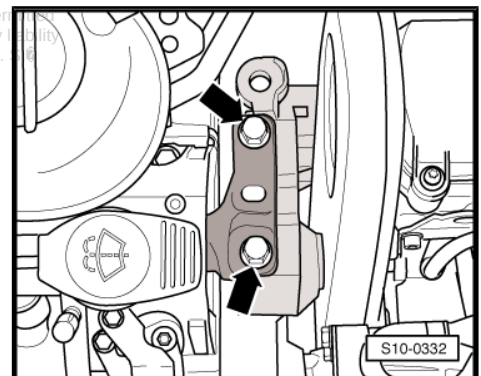


**Note**

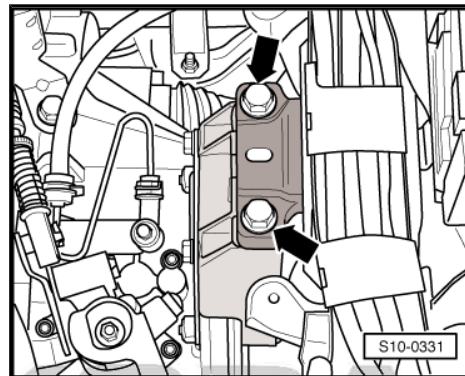
*Use double ladder - VAS 5085- to release the screws for the assembly bracket.*



- Release the screws -arrows- of the assembly bracket at the engine.
- Unscrew the bolts -arrows- of the mount on the gearbox:





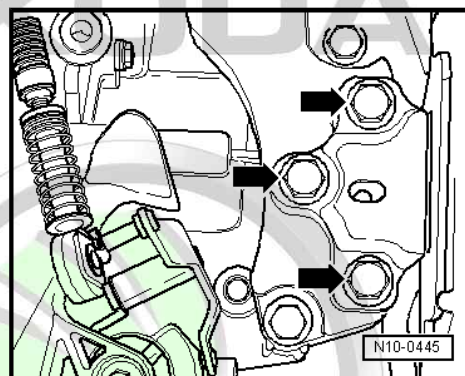


- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ
- ◆ Vehicles with engine identification characters BWA



#### Note

- ◆ Check whether all hose and line connections between engine, gearbox and body are released.
- ◆ When lowering carefully guide the engine/gearbox assembly, in order to avoid damage.



#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

- Pull engine/gearbox unit as far forward as possible and lower slowly downwards.

#### Vehicles with engine identification characters BWA

- Lower the engine/gearbox assembly with the help of a 2nd mechanic.
- When lowering it, watch out for constrictions (“AC compressor” and “turbocharger”).
- Lower the engine/gearbox unit somewhat, then pull forward as far as possible to the front, turn to the left, and lower further.

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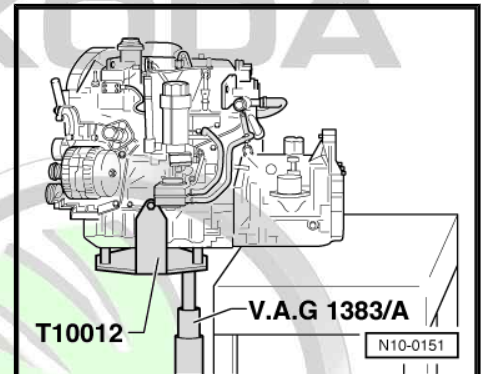


## 2 Securing the engine to the assembly stand

### Special tools and workshop equipment required

- ◆ Lifting device - MP9-201 (2024A)-
- ◆ Engine bracket - MP1-202 (VW 540)-
- ◆ Assembly stand - MP9-101-
- ◆ Workshop crane , e.g. -VAS 6100-
- Drive the engine with gearbox with the engine and gearbox jack - V.A.G 1383 A- onto a work bench.
- Lower the engine with gearbox in such a way that the gearbox is positioned on the support.
- Remove engine/gearbox connecting screws.
- Press gearbox from engine.

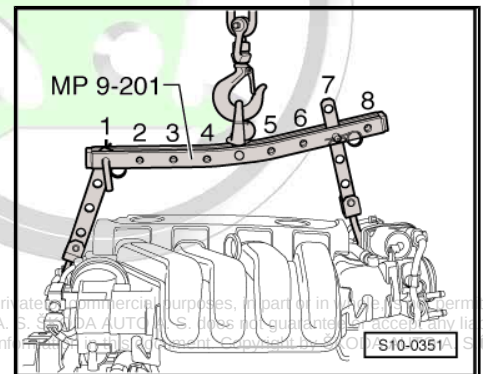
**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**



- Suspend the lifting device - MP9-201- as follows and remove the engine from the engine mount - T10012- using the workshop crane .

On the belt pulley side: 4. Hole of vertical perforated rails in Position 1

On the flywheel side: 3. Hole of vertical perforated rails in Position 7



### WARNING

*Use securing pins on the hooks and rig pins in order to avoid injuries and damage to the engine.*

- ◆ The securing positions of the handle labelled 1...4 point towards the belt pulley.
- ◆ The holes in the perforated bars are counted from the hook.

**Vehicles with engine identification characters BWA**



- Suspend the lifting device - MP9-201- as follows and remove the engine from the engine mount - T10012- using the workshop crane .

On the belt pulley side: 2. Hole of vertical perforated rails in Position 1

On the flywheel side: 1. Hole of vertical perforated rails in Position 8



# **WARNING**

*Use securing pins on the hooks and rig pins in order to avoid injuries and damage to the engine.*

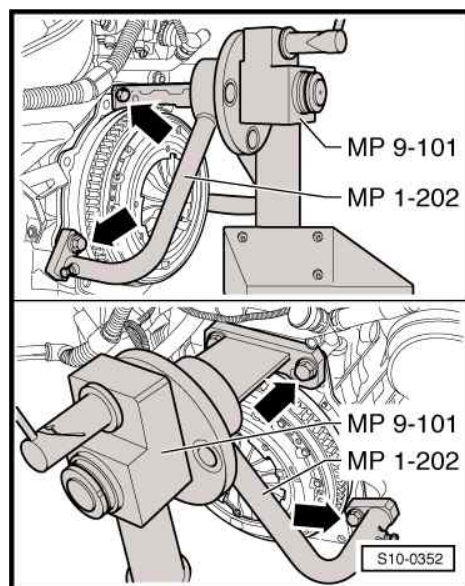
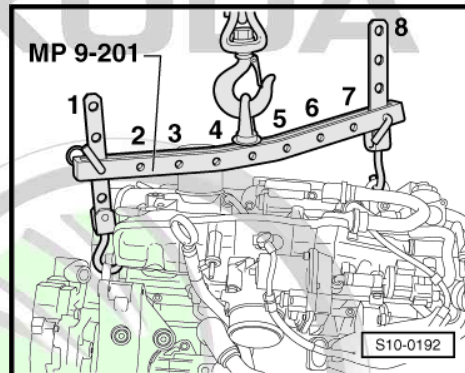
- ♦ The securing positions of the handle labelled 1...4 point towards the belt pulley.
- ♦ The holes in the perforated bars are counted from the hook.

## **Continued for all vehicles**

Secure the engine with engine mount - MP1-202- on the assembly stand - MP9-101- before performing assembly work.

- Unbolt and detach gearbox from engine.
- Screw engine mount - MP1-202- to engine and secure to the assembly stand - MP9-101- .

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## 3 Installing engine

### 3.1 Installing engine

Installation is carried out in the reverse sequence. Pay attention to the following:



#### Caution

*When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:*

- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, the active charcoal container-unit, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*



#### Note

- ◆ *Fit all cable straps on again in the same place when installing.*
  - ◆ *Secure all hose connections with hose clamps ⇒ Electronic Catalogue of Original Parts .*
  - ◆ *When performing installation work replace the self-locking nuts.*
  - ◆ *Replace screws which have been tightened to a torquing angle as well as gasket rings and seals.*
  - ◆ *Clean the drive shaft serration and, for used clutch discs, clean the hub serration, remove corrosion and only apply a very thin layer of grease - G 000 100- to the serration. Then move the disc up and down on the drive shaft until it runs smoothly on the shaft. Remove all excess grease.*
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Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ [page 4](#) .

- Insert new dowel sleeves for centering the engine/transmission into the cylinder block.



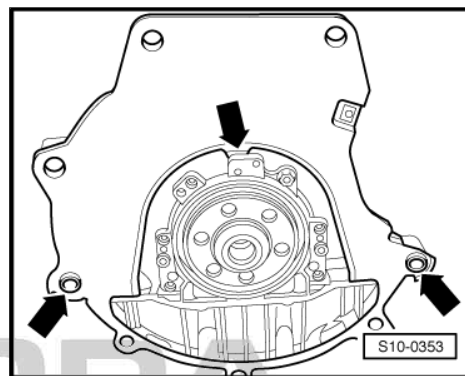
- Ensure that the intermediate plate has been inserted on the sealing flange and is pushed onto the dowel sleeves -arrows-.

#### Vehicles fitted with a manual gearbox

- Check the centering of the clutch disc; if necessary, install clutch and clutch mechanism ⇒ Gearbox; Rep. gr. 30 .
- Check clutch release bearing for wear and renew if necessary.
- Lightly lubricate spline of input shaft with grease - G 000 100- .

#### Continued for all vehicles

- Screw on gearbox to the engine ⇒ [page 28](#) .
- When installing the engine/gearbox assembly, ensure clearance to the assembly carrier and the radiator.



#### Vehicles with four-wheel drive



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**i** Note

- ◆ When installing the engine, do not damage the sealing ring -arrow- of the propshaft.
- ◆ If the sealing ring -arrow- is damaged, the propshaft must be replaced.

Continued for all vehicles

**i** Note

When swivelling the unit, ensure clearance to the drive shaft.

- Align and attach the assembly mounting stress-free by jogging it.

**i** Note

- ◆ Checking and adjusting the assembly bracket ⇒ [page 29](#) .
- ◆ Specified torques for assembly mountings ⇒ [page 31](#) .

- Install pendulum support ⇒ [page 31](#) .
- Install drive shafts ⇒ Chassis; Rep. gr. 40 .

**Vehicles with air conditioning**

- Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
- Install the V-ribbed belt ⇒ [page 39](#) .

**Vehicles fitted with a manual gearbox**

- Install slave cylinder ⇒ Gearbox; Rep. gr. 30 .
- Attach shift mechanism and adjust if necessary ⇒ Gearbox; Rep. gr. 34 .

**Vehicles with automatic gearbox**

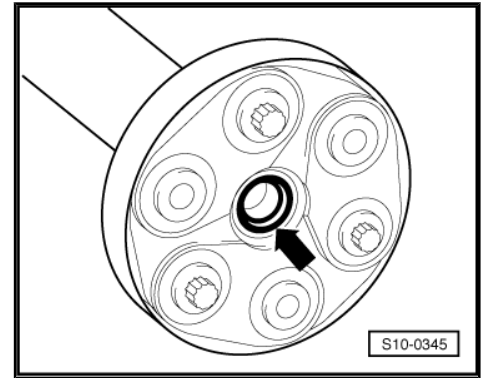
- Fit and adjust the selector lever cable ⇒ Gearbox; Rep. gr. 37 .

**Vehicles with four-wheel drive**

- Install propshaft ⇒ Gearbox; Rep. gr. 39 .

Continued for all vehicles

- Insert the plug of the engine wiring harness onto the engine control unit ⇒ [page 268](#) .



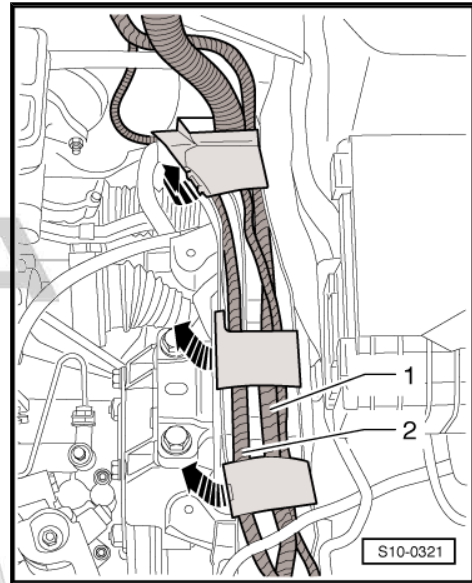




- Lay the engine wiring harness to the control unit -1- at bottom left (in direction of travel) of the wiring harness -2-.
- Install the bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .
- Install exhaust system and align free of stress ⇒ [page 289](#) .
- Install the lock carrier ⇒ Body Work; Rep. gr. 50 .
- Install the battery tray and battery ⇒ Electrical System; Rep. gr. 27 .
- Top up coolant ⇒ [page 149](#) .
- Interrogate all event memories and delete all event entries which are caused by removing and installing the engine ⇒ Vehicle diagnostic tester.

After deleting the event memory of the engine control unit the readiness code must be re-generated.

- Perform a test drive.
- Then perform a vehicle system test and if necessary eliminate the resulting faults.



#### Tightening torques

| Component                                                                                                                                                                                                                                                                                                                              |     | Nm |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| Screws/nuts                                                                                                                                                                                                                                                                                                                            | M6  | 9  |
|                                                                                                                                                                                                                                                                                                                                        | M7  | 13 |
|                                                                                                                                                                                                                                                                                                                                        | M8  | 20 |
|                                                                                                                                                                                                                                                                                                                                        | M10 | 40 |
|                                                                                                                                                                                                                                                                                                                                        | M12 | 70 |
| deviations: <small>Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by ŠKODA AUTO A. S. ŠKODA AUTO A. S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by ŠKODA AUTO A. S.®</small> |     |    |
| Engine/gearbox connecting screws:                                                                                                                                                                                                                                                                                                      |     |    |
| ◆ ⇒ Gearbox; Rep. gr. 34                                                                                                                                                                                                                                                                                                               |     |    |
| ◆ ⇒ Automatic gearbox; Rep. gr. 37                                                                                                                                                                                                                                                                                                     |     |    |
| Screws for assembly bracket ⇒ <a href="#">page 31</a>                                                                                                                                                                                                                                                                                  |     |    |

## 4 Assembly bracket

### 4.1 Checking and adjusting the assembly bracket

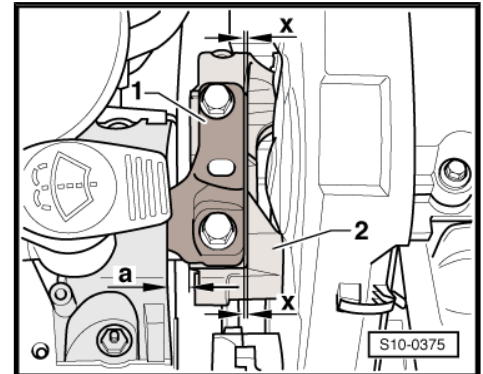
#### 4.1.1 Checking the assembly bracket

- Check dimensions on the right hanger for engine/gearbox unit:
- Between engine bracket and engine support there must be a distance -a- of 10 ... 13 mm.
- The cast iron edge on the engine support -2- must be parallel to the supporting arm -1- the dimension -x- must be the same at the front and rear.



#### Note

*The distance -a- can be checked, for example with suitable round bars.*



Only if there is an acoustic complaint (engine or gearbox knock on the frame side rail when cornering) and the dimension -a- is outside 10 ... 13 mm:

- Adjust the assembly bracket ➤ [page 29](#) .

#### 4.1.2 Adjusting the unit mounting

##### Special tools and workshop equipment required

- ◆ Supporting device - T30099-
- ◆ Base - T30099/1-
- ◆ Adapter - MP9-200/3 (10-222/3)- , only for engine identification characters BWA
- ◆ Hook for MP9-200 and T30099 - MP9-200/10 (10-222/10)- , only engine identification characters BWA
- ◆ Shackle - 10-222 A/12- (x3), only for engine identification characters BWA

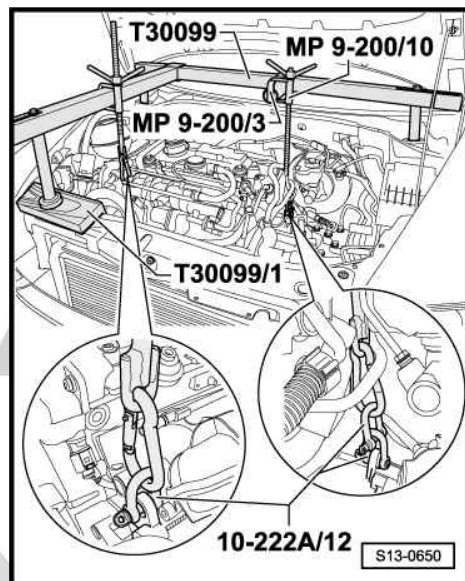
If the measured distance is too great or too small, proceed as follows:

- Remove battery and battery tray ➤ Electrical System; Rep. gr. 27 .
- Remove the cooling water tank cover ➤ Body Work; Rep. gr. 66 .



### Vehicles with engine identification characters BWA

- Replace supporting device - T30099- and mount the engine in installation position.

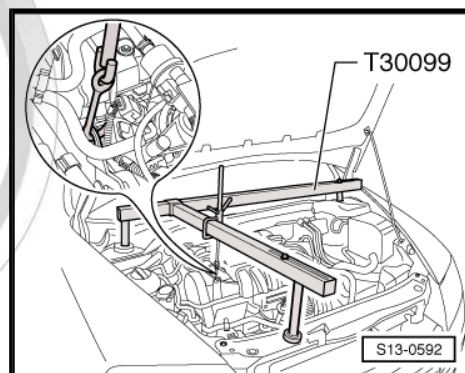


### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

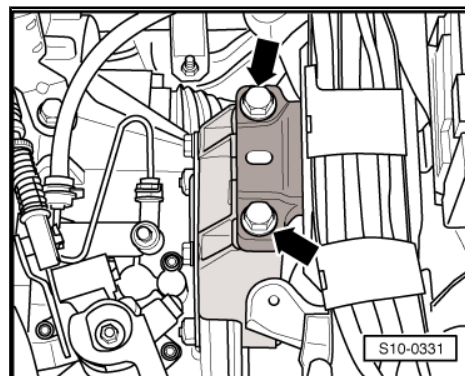
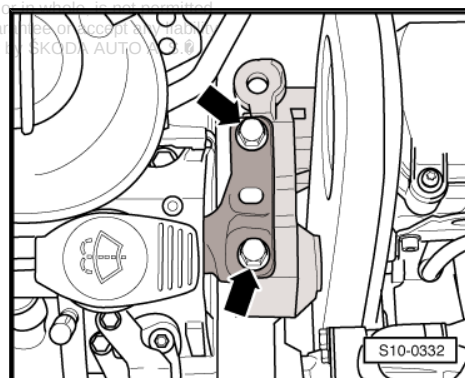
- Fit supporting device - T30099- with supporting plate - T30099/1- (not shown in illustration) and support engine in installation position.

#### Continued for all vehicles

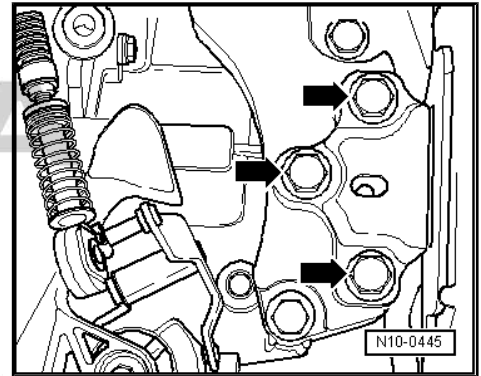
- Uniformly pre-tension the engine with both spindles, but do not raise.



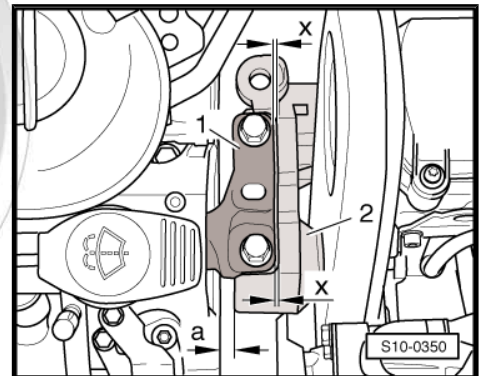
- Release the screws -arrows- of the assembly bracket at the engine.
- Slightly loosen the screws -arrows- of the assembly bracket at the gearbox (less than 1 revolution).



- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ
- ◆ Vehicles with engine identification characters BWA
- Successively replace all the screws (as long as it has not already been performed when installing the engine) and insert these loosely.



- Move the engine with an assembly lever between the supporting arm -1- and the engine support bracket -2- until the bolts are centred in the elongated holes.
- Between engine support bracket and right frame side rail, there must be a distance -a- of at least 10 mm.
- The cast-metal edge on the engine support bracket -2- must be parallel to the supporting arm -1-. The dimension -a- must be the same at the front and rear.



#### Note

*The distance -a- can be checked, for example with suitable round bars.*

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- Tighten the screws for the engine side assembly bracket  
⇒ [page 31](#) .
- Tighten the screws for the gearbox side assembly bracket  
⇒ [page 31](#) .

## 4.2 Assembly bracket

### Engine mounting

1 = 20 Nm + torque a further 90° (1/4 turn)

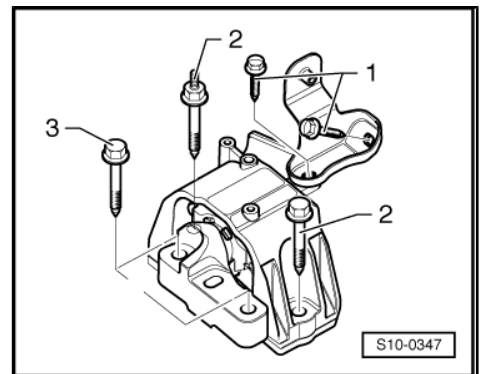
Replace bolts

2 = 40 Nm + torque a further 90° (1/4 turn)

Replace bolts

3 = 60 Nm + torque a further 90° (1/4 turn)

Replace bolts



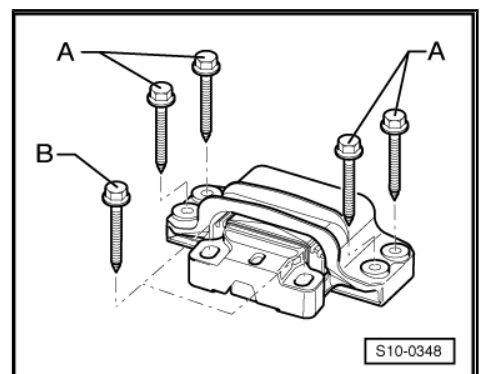
### Gearbox mount 02S and 09G

A = 40 Nm + torque a further 90° (1/4 turn)

Replace bolts

B = 60 Nm + torque a further 90° (1/4 turn)

Replace bolts





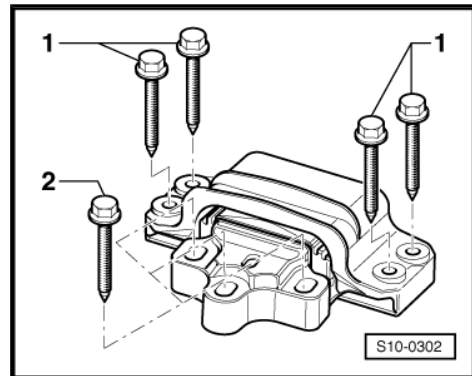
### Assembly bracket gearbox 02Q

1 = 40 Nm + torque a further 90° (1/4 turn)

Replace bolts

2 = 60 Nm + torque a further 90° (1/4 turn)

Replace bolts



### Pendulum support

Bolt -A- strength class 8.8 = 40 Nm + torque a further 90° (1/4 turn)

Replace bolts

Bolt -A- strength class 10.9 <sup>1)</sup> = 50 Nm + torque a further 90° (1/4 turn)

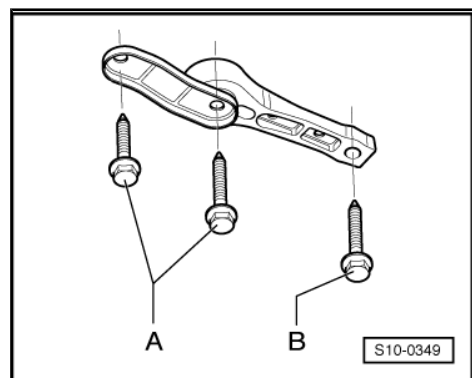
Replace bolts

Bolt -B- = 100 Nm + torque a further 90° (1/4 turn)

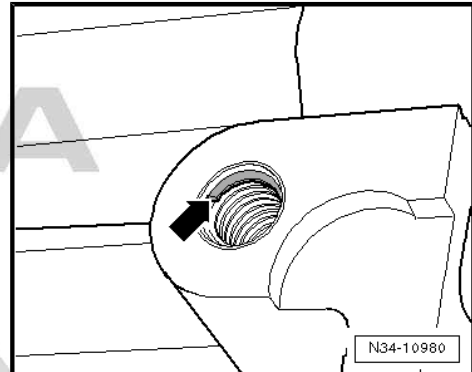
Replace bolt

Removing: First unscrew screw -B-, then screw -A-.

Installing: First tighten screw -A-, then screw -B-.



<sup>1)</sup> On manual gearbox MQ350 (02Q), only use the screws with the strength class 10.9 if threaded inserts (e.g. HeliCoil) -arrow- have been installed.



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## 13 – Crankshaft group

### 1 Disassembling and assembling the engine - Part 1

#### 1.1 V-ribbed belt drive - Summary of components

Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

##### 1 - Vibration damper

- ☐ Contact surfaces must be free of oil and grease.

##### 2 - 10 Nm + torque a further 90° (1/4 turn)

- ☐ replace

##### 3 - 23 Nm

##### 4 - Lifting eye

##### 5 - Tensioning device for V-ribbed belt

- ☐ swivel tensioning device for V-ribbed belt with open-end wrench to slacken the V-ribbed belt

##### 6 - Bracket for auxiliary units

- ☐ observe the order of tightening up  
⇒ [page 35](#)

##### 7 - Nut

##### 8 - Generator

- ☐ removing and installing  
⇒ Electrical System; Rep. gr. 27
- ☐ to facilitate the positioning of the generator, drive the threaded bushings for fixing screws at the generator slightly backwards

##### 9 - 45 Nm

- ☐ observe the order of tightening up ⇒ [page 35](#)
- ☐ insert using locking agent - D 000 600 A2-

##### 10 - Bushing

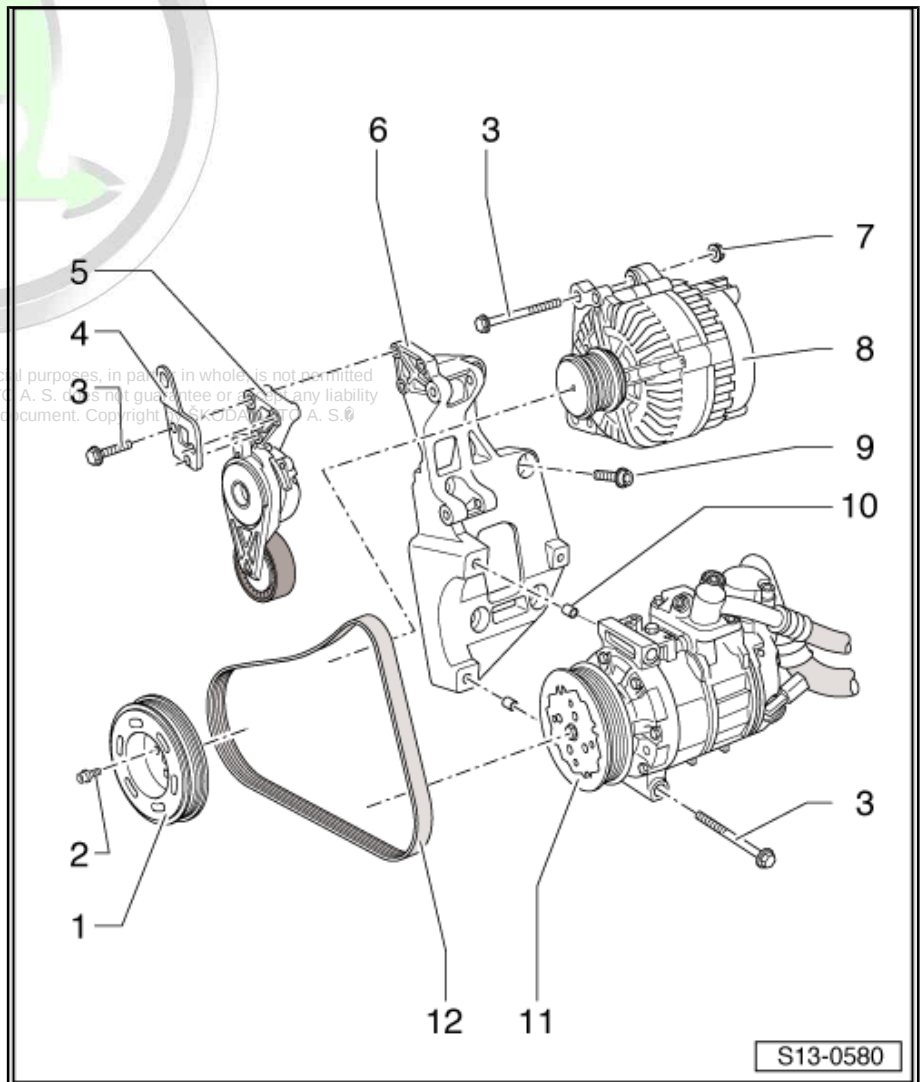
- ☐ 2 pieces

##### 11 - AC compressor

- ☐ removing and installing ⇒ Heating, Air Conditioning; Rep. gr. 87

##### 12 - V-ribbed belt

- ☐ Routing of the V-ribbed belt without AC compressor ⇒ [page 35](#)
- ☐ Routing of the V-ribbed belt with AC compressor ⇒ [page 35](#)





- ☐ check for wear
- ☐ do not kink
- ☐ removing and installing ➔ [page 39](#)

## Engine identification characters BWA

### 1 - Bracket for auxiliary units

- ☐ observe the order of tightening up  
➔ [page 35](#)

### 2 - 23 Nm

### 3 - Threaded bush

### 4 - Generator

- ☐ removing and installing  
➔ Electrical System;  
Rep. gr. 27
- ☐ to facilitate the positioning of the generator, drive the threaded bushings for fixing screws at the generator slightly backwards

### 5 - 45 Nm

- ☐ observe the order of tightening up  
➔ [page 35](#)

### 6 - Bushing

- ☐ 2 pieces

### 7 - 23 Nm

### 8 - AC compressor

- ☐ removing and installing  
➔ Heating, Air Conditioning; Rep. gr. 87

### 9 - V-ribbed belt

- ☐ Routing of the V-ribbed belt without AC compressor ➔ [page 35](#)
- ☐ Routing of the V-ribbed belt with AC compressor  
➔ [page 35](#)
- ☐ check for wear
- ☐ do not kink
- ☐ removing and installing ➔ [page 39](#)

### 10 - Vibration damper

- ☐ Contact surfaces must be free of oil and grease.

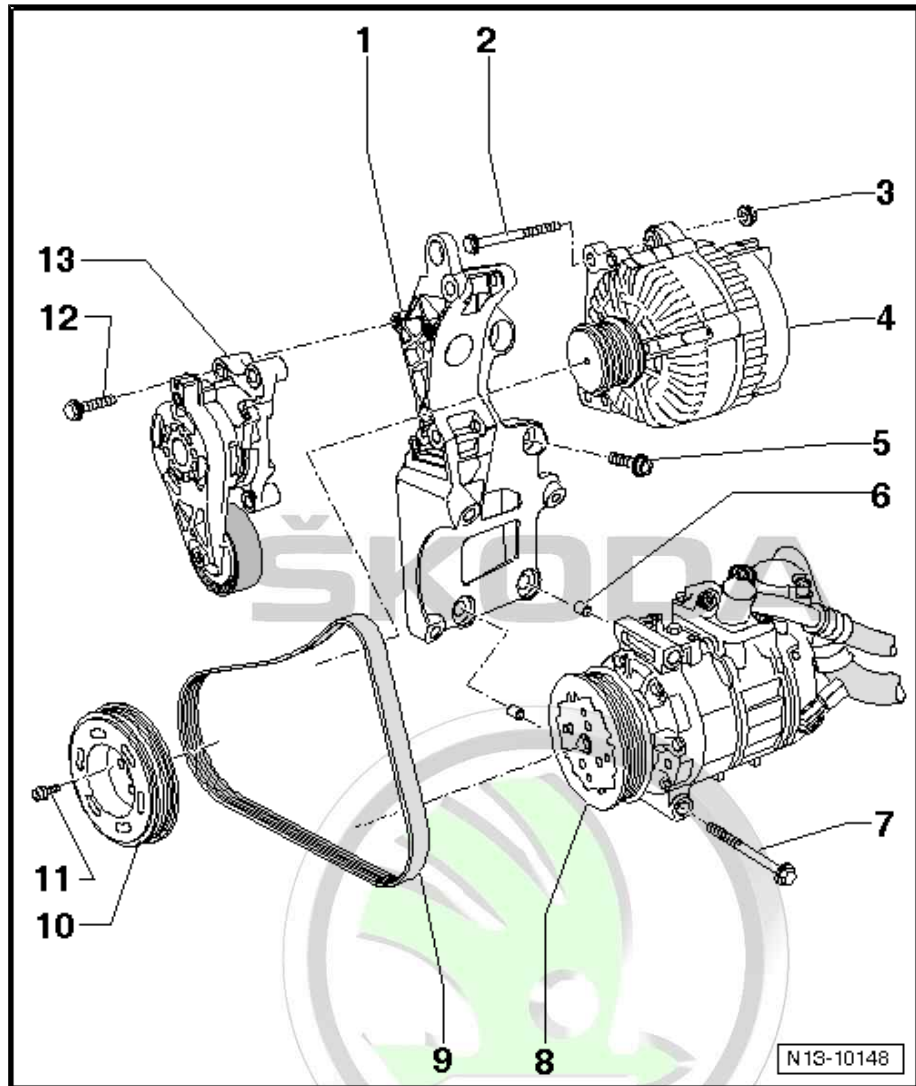
### 11 - 20 Nm + torque a further 90° (1/4 turn)

- ☐ replace

### 12 - 23 Nm

### 13 - Tensioning device for V-ribbed belt

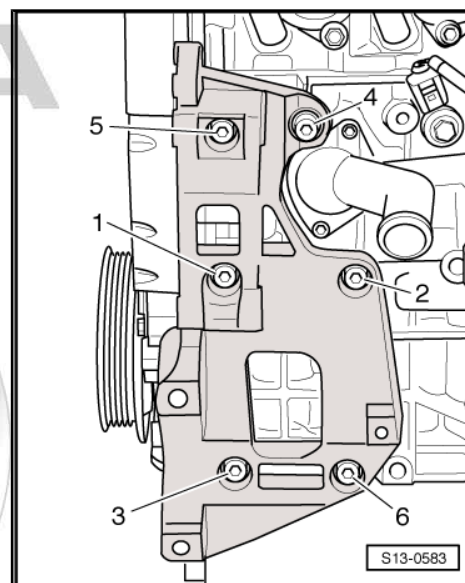
- ☐ swivel tensioning device for V-ribbed belt with open-end wrench to slacken the V-ribbed belt



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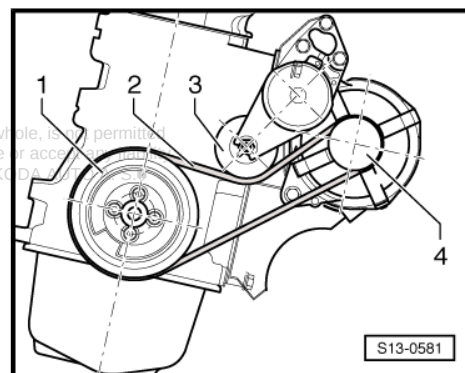
### Tightening order of bracket for auxiliary units

- First tighten all bolts hand-tight starting with bolts -4 and 6- (dowel holes).
- Then tighten the bolts in the sequence -1 to 6-.



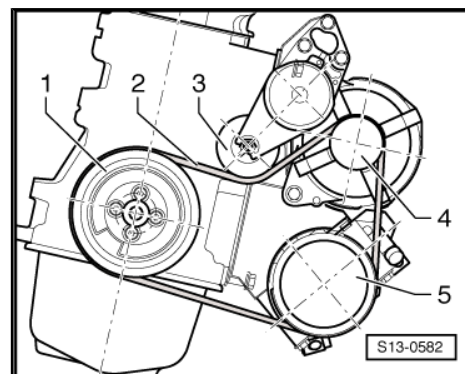
### Routing of the V-ribbed belt without AC compressor

- 1 - Vibration damper
- 2 - V-ribbed belt
- 3 - Tensioning pulley
- 4 - Belt pulley for AC generator



### Routing of the V-ribbed belt with AC compressor

- 1 - Vibration damper
- 2 - V-ribbed belt
- 3 - Tensioning pulley
- 4 - Belt pulley for AC generator
- 5 - Belt pulley for AC compressor



## 1.2 Toothed belt drive - summary of components, engines without split toothed belt guard



1 - 10 Nm

2 - Top toothed belt guard

3 - 50 Nm + torque a further 180° (1/2 turn)

- ☐ replace
- ☐ to release and tighten use counterholder - MP1-216 (3036)-

4 - Camshaft pulley

- ☐ Installation position fixed by woodruff key

5 - 10 Nm

- ☐ insert using locking agent - D 000 600 A2-

6 - Rear toothed belt guard

7 - Woodruff key

- ☐ check tightness

8 - 23 Nm

9 - Semi-automatic tensioning pulley

10 - Coolant pump

- ☐ removing and installing ⇒ [page 153](#)

11 - O-ring

- ☐ replace

12 - 25 Nm

- ☐ insert using locking agent - D 000 600 A2-

13 - Idler roller

14 - 15 Nm

15 - 35 Nm

16 - Idler roller

17 - Sealing flange

- ☐ removing and installing ⇒ [page 63](#)

18 - Diamond-coated washer

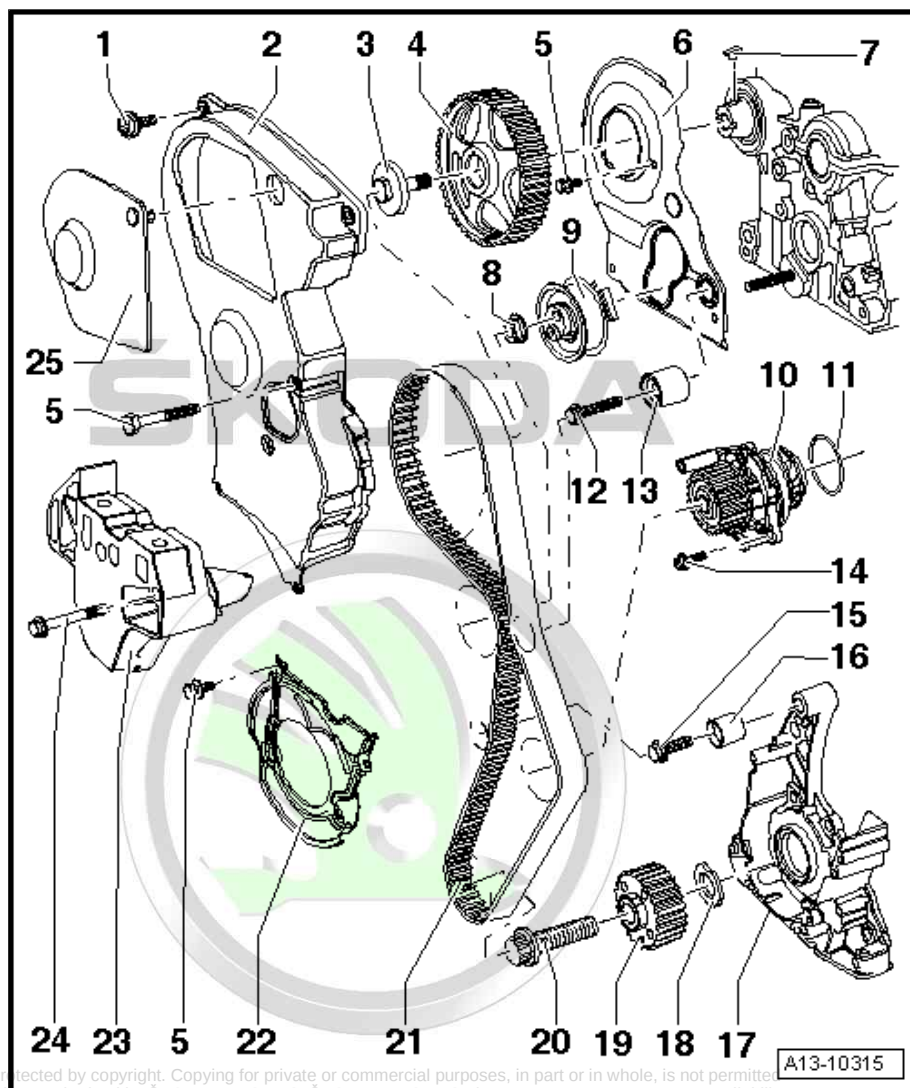
- ☐ for crankshaft toothed belt sprocket
- ☐ Only installed for engine identification characters BWA
- ☐ replace

19 - Crankshaft toothed belt sprocket

- ☐ there must not be any oil present on the contact surface between the toothed belt sprocket and the crankshaft
- ☐ can be installed only in one position

20 - 90 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ do not oil
- ☐ to release and tighten use counterholder - T30004 (3415)- or -MP1-310 (3036)-



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## 21 - Toothed belt

- ☐ mark the direction of rotation with chalk or a felt-tip pen before removing
- ☐ check for wear
- ☐ removing and installing ➔ [page 40](#)

## 22 - Bottom toothed belt guard

## 23 - Engine support bracket

## 24 - 45 Nm

## 25 - Cover for top toothed belt guard

# 1.3 Toothed belt drive - summary of components, engines with split toothed belt guard

## 1 - 10 Nm

## 2 - Top toothed belt guard

## 3 - 50 Nm + torque a further 180° (1/2 turn)

- ☐ replace
- ☐ to release and tighten use counterholder - MP 1-216 (3036)-

## 4 - Camshaft pulley

- ☐ Installation position fixed by woodruff key

## 5 - 10 Nm

- ☐ insert using locking agent - D 000 600 A2-

## 6 - Rear toothed belt guard

## 7 - Woodruff key

- ☐ check tightness

## 8 - 23 Nm

## 9 - Semi-automatic tensioning pulley

## 10 - Coolant pump

- ☐ removing and installing ➔ [page 153](#)

## 11 - O-ring

- ☐ replace

## 12 - 25 Nm

- ☐ insert using locking agent - D 000 600 A2-

## 13 - Idler roller

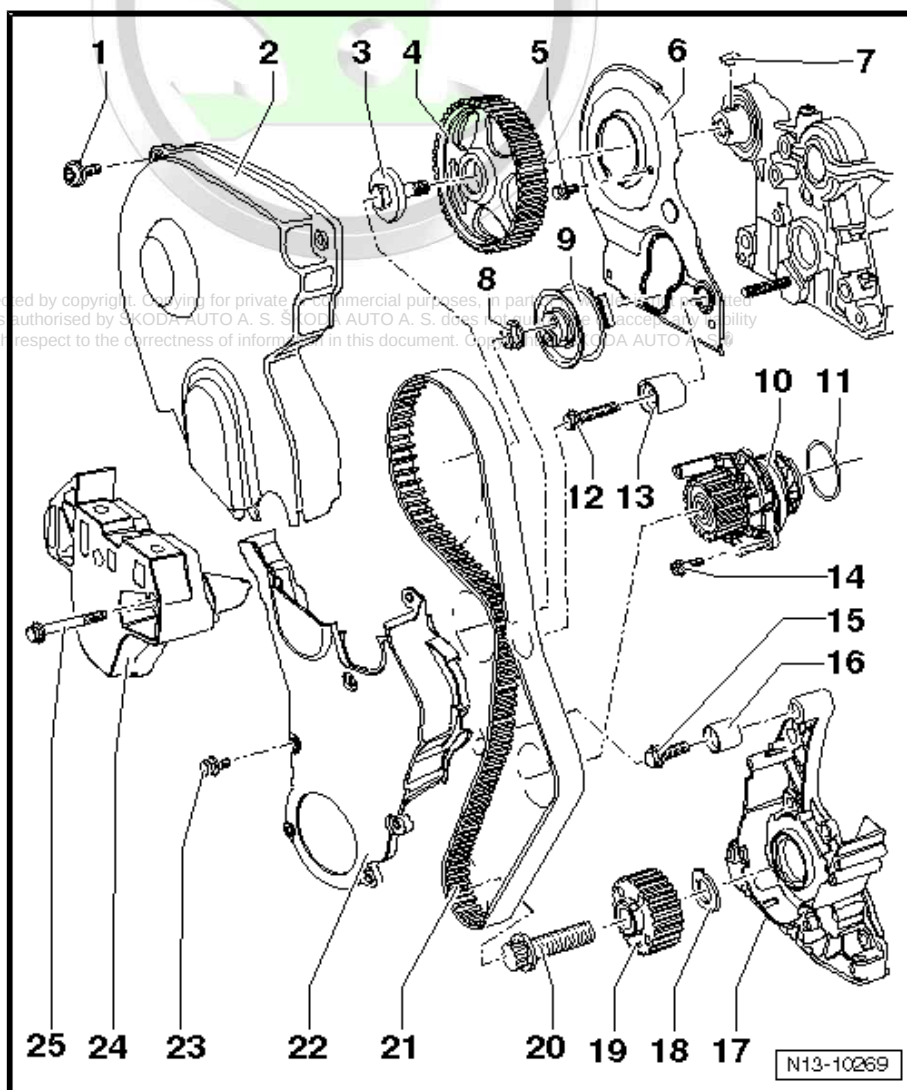
## 14 - 15 Nm

## 15 - 35 Nm

## 16 - Idler roller

## 17 - Sealing flange

- ☐ removing and installing ➔ [page 63](#)





**18 - Diamond-coated washer**

- ☐ for crankshaft toothed belt sprocket
- ☐ Only installed for engine identification characters BWA
- ☐ replace

**19 - Crankshaft toothed belt sprocket**

- ☐ there must not be any oil present on the contact surface between the toothed belt sprocket and the crankshaft
- ☐ can be installed only in one position

**20 - 90 Nm + torque a further 90° (1/4 turn)**

- ☐ replace
- ☐ do not oil
- ☐ to release and tighten use counterholder - T30004 (3415)- or -MP1-310 (3036)-

**21 - Toothed belt**

- ☐ mark the direction of rotation with chalk or a felt-tip pen before removing
- ☐ check for wear
- ☐ removing and installing ⇒ [page 50](#)

**22 - Bottom toothed belt guard****23 - 8 Nm**

- ☐ Securing bolts for bottom toothed belt guard
- ☐ 7 pieces

**24 - Engine support bracket****25 - 45 Nm**

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## 2 Disassembling and assembling the engine - Part 2

### 2.1 Removing and installing V-ribbed belt

#### Special tools and workshop equipment required

- ◆ Locking pin - T10060 A-

#### Removing

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .

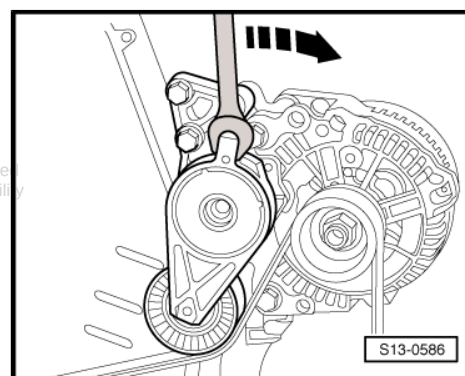
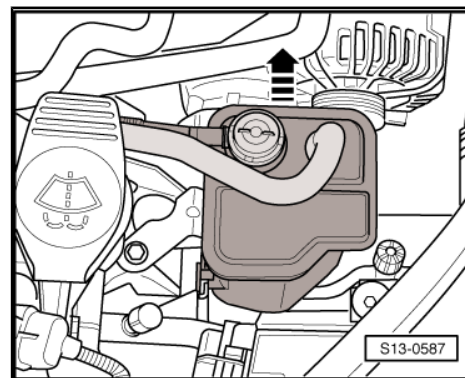
#### Vehicles with engine identification characters BWA

- Remove engine cover ⇒ [page 242](#) .

#### Continued for all vehicles

- Pull activated charcoal filter with its attached lines upwards in -direction of arrow- out of the mounting and place to the side.
- Mark the rotation direction of the V-ribbed belt.

- Loosen the V-ribbed belt by swivelling the tensioning element in -the direction of the arrow-.



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- Interlock the tensioning element with the locking pin - T10060 A- .
- Remove poly V-belt.

### Install

- Installation is carried out in the reverse sequence. Pay attention to the following:



### Note

- ♦ Pay attention to the correct position and rotation direction of the V-ribbed belt in the belt pulley when installing it.
- ♦ On vehicles without air conditioning system, finish by placing the V-ribbed belt on the belt pulley for the AC generator  
⇒ [page 33](#) .
- ♦ On vehicles with air conditioning system, finish by placing the V-ribbed belt on the belt pulley for the AC compressor  
⇒ [page 33](#) .

Each time work has been completed:

- Start engine and check belt run.

## 2.2 Removing and installing toothed belt, engines without split toothed belt guard

### Special tools and workshop equipment required

- ♦ Supporting device - T30099-
- ♦ Base - T30099/1-
- ♦ Locking pin - T10060 A-
- ♦ Pliers for spring strap clamps
- ♦ Adapter - MP9-200/3 (10-222/3)- , only for engine identification characters BWA
- ♦ Hook for MP9-200 and T30099 - MP9-200/10 (10-222/10)- , only engine identification characters BWA
- ♦ Shackle - 10-222 A/12 (10-222/12)- (x3), only for engine identification characters BWA
- ♦ Hose clamp up to Ø 25 mm - MP7-602 (3094)- , only engine identification characters BWA

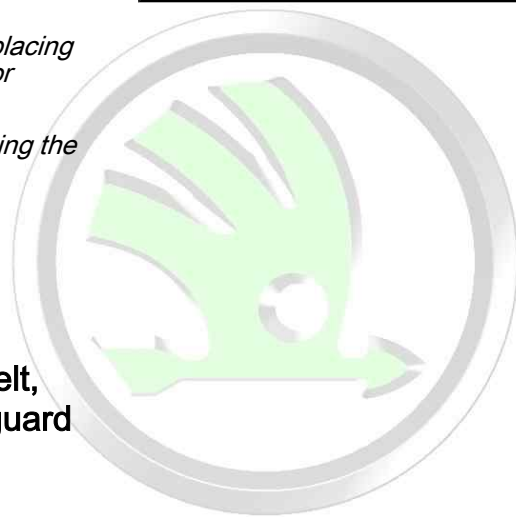
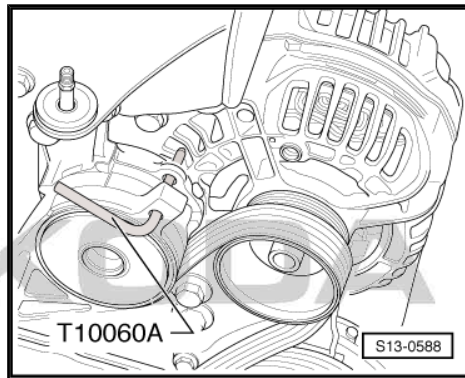
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### 2.2.1 Removing



### Note

*To be able to remove the engine support bracket, the engine with the supporting device - T30099- must be raised quite high. TO avoid damaging the drive shafts with the significant bend, the drive shafts must be detached from the gearbox.*



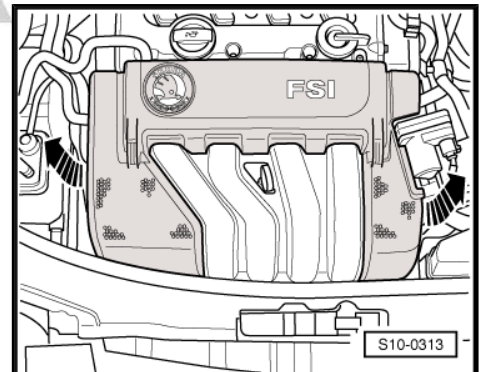


#### Note

- ◆ *Safety precautions when working on the fuel supply system*  
⇒ [page 4](#) .
- ◆ *Observe cleanliness requirements when working on the fuel system* ⇒ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.

#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ

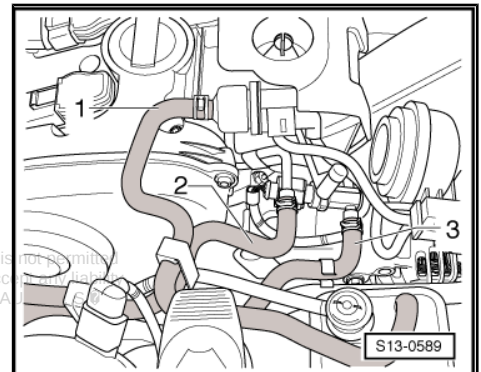
- Pull off engine cover upwards at the sides -arrows-.



- Disconnect hose to activated charcoal filter -1-.
- Detach the fuel feed line -2- and the fuel return-flow line -3-.

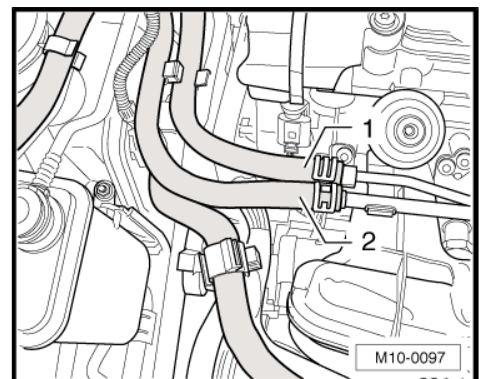
#### Vehicles with engine identification characters BWA

- Remove engine cover ⇒ [page 242](#) .
- Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .



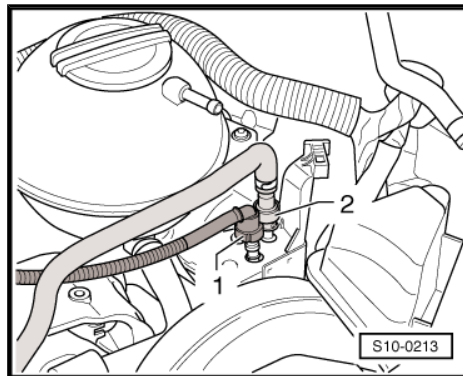
- Mark hoses -1- and -2- and disconnect from the lines.

#### Continued for all vehicles

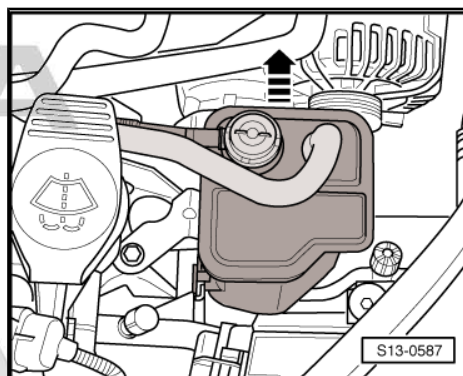




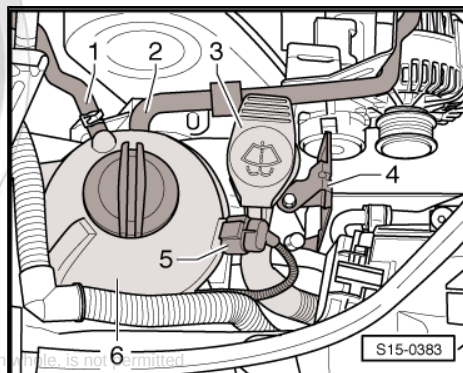
- Disconnect the vacuum line -1- and the fuel feed line -2- (press in the circlip). Lay the lines to the side.



- Pull activated charcoal filter with attached lines upwards out of the mounting bracket -arrow-.



- Unscrew bolts on filler neck for windshield washer fluid reservoir -3-.
- Unscrew bracket -4- for activated charcoal filter.
- Disconnect plug connection -5-.



#### WARNING

**Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.**

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- Open the cap of the expansion reservoir -6- to reduce the pressure in the cooling system.
- Then close the expansion reservoir again.
- Disconnect coolant hose -1- from expansion reservoir -6-.
- Unclip coolant hose -2- from the mounting.
- Detach expansion reservoir -6- and place on the engine with coolant hose attached -2-.

**Vehicles with engine identification characters BWA**



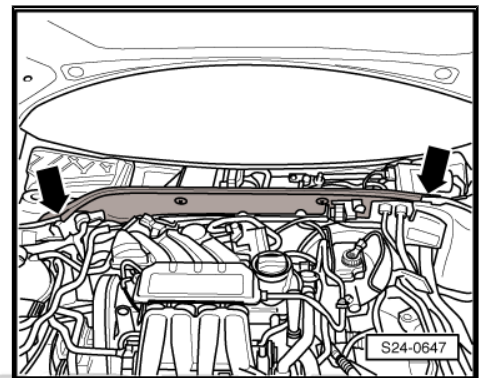
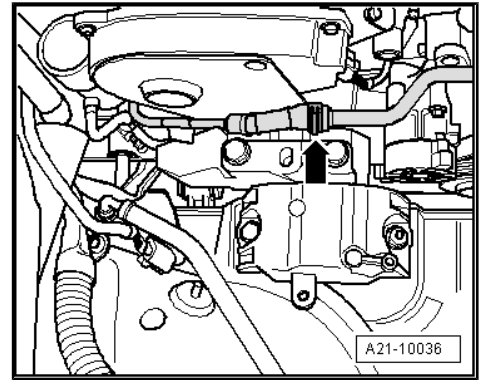
- Clamp off the coolant hose -arrow- using a hose clamp of up to Ø 25 mm - MP7-602- .
- Disconnect line on coolant pipe -arrow-.

**Continued for all vehicles**

- Remove V-ribbed belt ⇒ [page 39](#) .
- Remove the locking pin - T10060 A- from the V-ribbed belt tensioning device.
- Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .

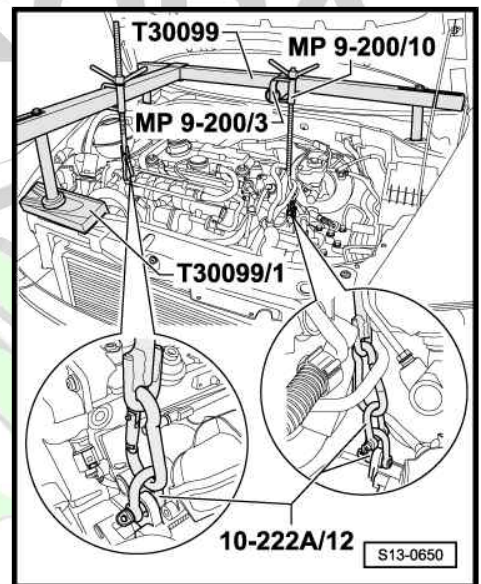
**Vehicles with engine identification characters BWA**

- Remove bulkhead plenum chamber.



- Replace supporting device - T30099- and mount the engine in installation position.
- Uniformly pre-tension the engine with both spindles, but do not raise.

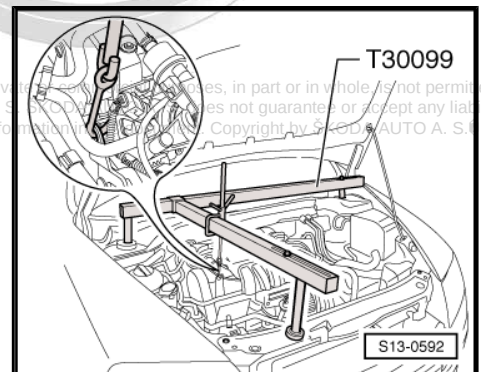
**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**



- Fit supporting device - T30099- with supporting plate - T30099/1- (not shown in illustration) and support engine in installation position.

**Continued for all vehicles**

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Remove the front part of the front right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .
- Remove the cover of the top toothed belt guard.



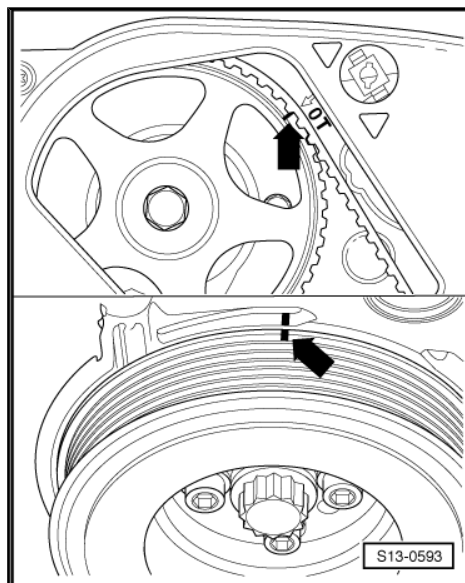


- Position camshaft sprocket to TDC marking for cylinder 1 by rotating at crankshaft.
- The marking on the camshaft sprocket must be aligned with the arrow on the toothed belt guard -arrows-.

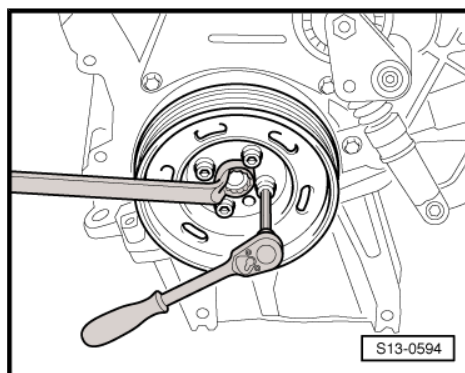


### Note

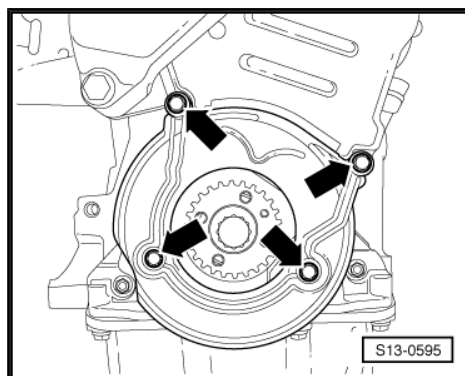
*You can only see the TDC marking on the toothed belt guard with a mirror.*



- Remove vibration damper/belt pulley.



- Unscrew the bolts from the bottom toothed belt guard -arrows-.

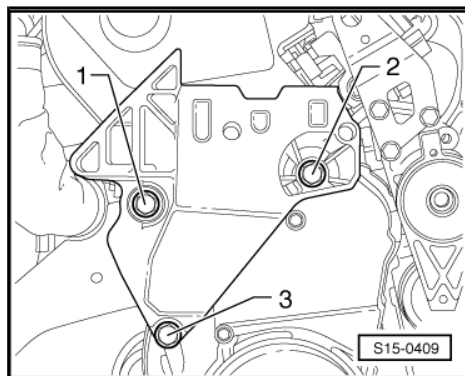


### Note

*Disregard -1- and -2-.*

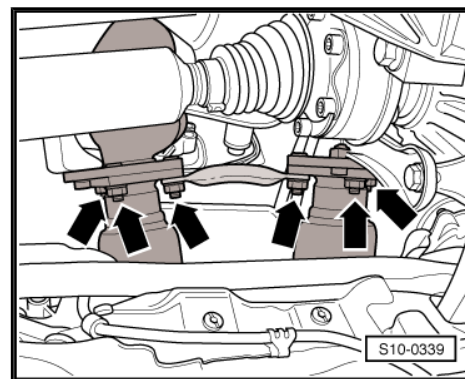
- Unscrew bottom bolt -3-.

**Vehicles with front-wheel drive**



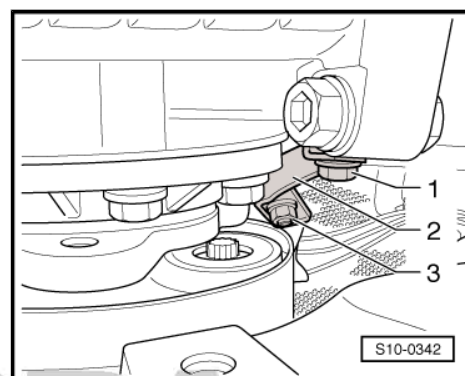
- Unscrew the securing nuts -arrows- of the front section of the exhaust system/exhaust manifold.

**Vehicles with four-wheel drive**

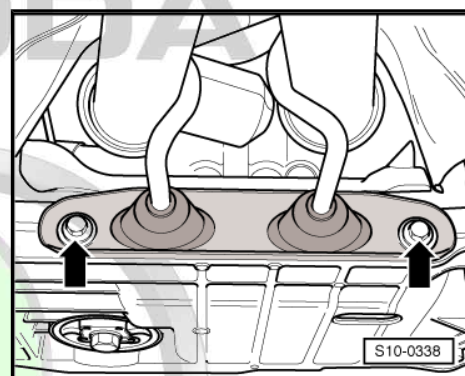


- Unscrew screw -1- on gearbox.
- Unscrew the securing nuts -3- (total of 6) of the front section of the exhaust system/exhaust manifold.
- Remove left strut -2- for exhaust manifold.

**Continued for all vehicles**



- Unbolt mounting for exhaust system -arrows-.



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- Unscrew the screws -2- and -3- of the pendulum support.

#### Vehicles with engine identification characters BWA



#### Note

*The next steps are required in order to be able to raise the engine far enough.*

- Remove pre-exhaust pipe ➤ [page 286](#) .

#### Continued for all vehicles

- Detach left and right of drive shaft from the gearbox ➤ Chassis; Rep. gr. 40 .

#### Vehicles with air conditioning



#### WARNING

**Do not open the refrigerant circuit of the air conditioning system.**

- Detach pipes of the air conditioning system from the body -arrows-.

#### Continued for all vehicles

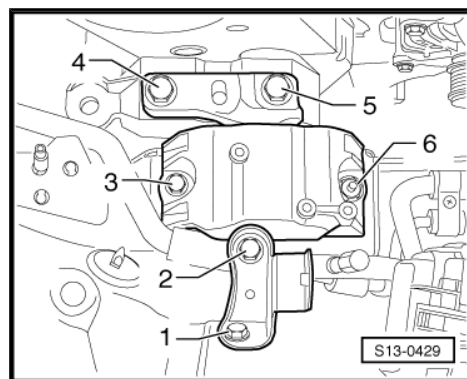
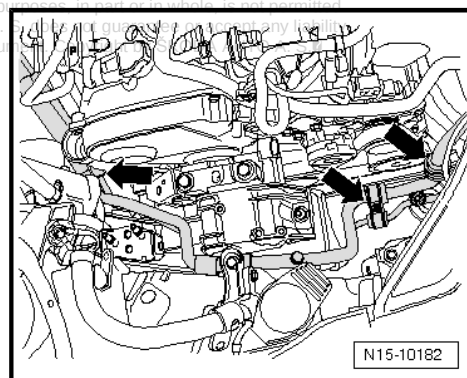
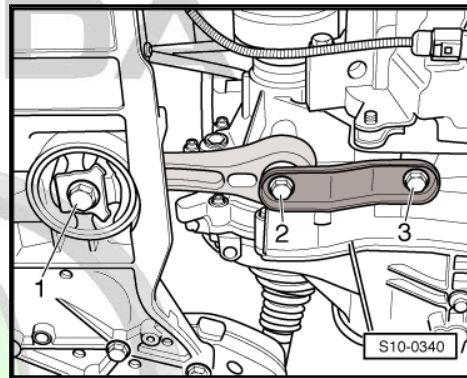
- Unscrew bolts -1- and -2- and remove the connecting cross-piece.
- Remove bolts -3- to -6- and remove engine mount.



#### Note

- ◆ *The assembly bracket must only be removed if the engine is supported with the supporting device - T30099- !*
- ◆ *Only release the engine support if the assembly bracket is removed.*

#### Vehicles with engine identification characters BWA





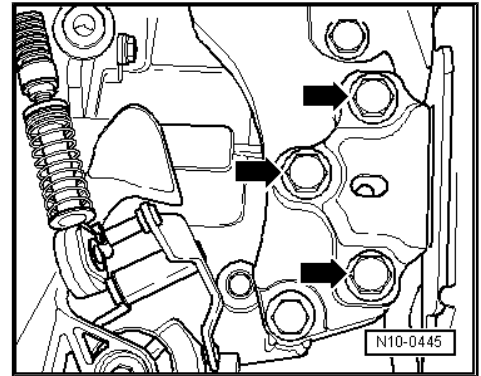
- Release the bolts -arrows- of the assembly bracket at the gearbox.

Continued for all vehicles

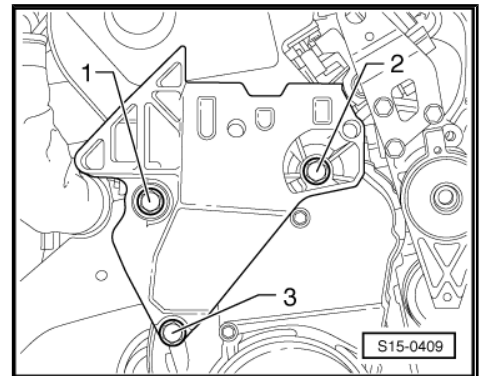


**Caution**

*Make sure that no components/hoses/lines are damaged, overstretched or torn off when raising the engine with the supporting device - T30099-.*



- Only raise the engine with the supporting device - T30099- so far that bolts -1- and -2- can be unscrewed and the engine support bracket can be pulled out.

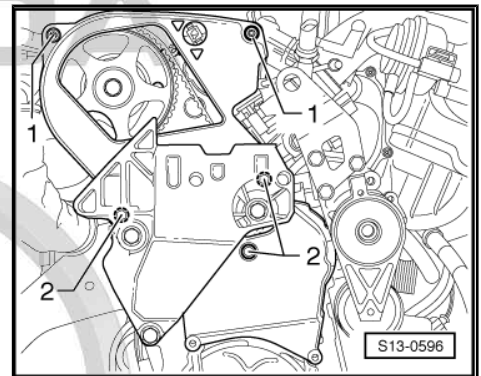


- Unscrew bolts -1- and -2- from the top toothed belt guard.



**Note**

*The top toothed belt guard may stick to the bottom toothed belt guard around the left bolt -2-. If so, carefully separate the parts with a screwdriver.*



- Remove bottom toothed belt guard.
- Take out top toothed belt guard.  
To do so, slightly raise the engine if necessary.
- Mark the rotation direction of the timing belt.
- Slacken tensioning pulley and take off timing belt.
- Then turn crankshaft back slightly.

## 2.2.2 Install

- The engine must be no more than warm to touch.



**Caution**

*When rotating the camshaft, the crankshaft must not be positioned at TDC. Risk of damaging valves and piston crowns.*

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- Fit timing belt onto the crankshaft timing belt sprocket (pay attention to direction of running).
- Position bottom toothed belt guard, insert bolts at bottom with locking agent - D 000 600 A2- and tighten.
- Install vibration damper/belt pulley with new bolts.





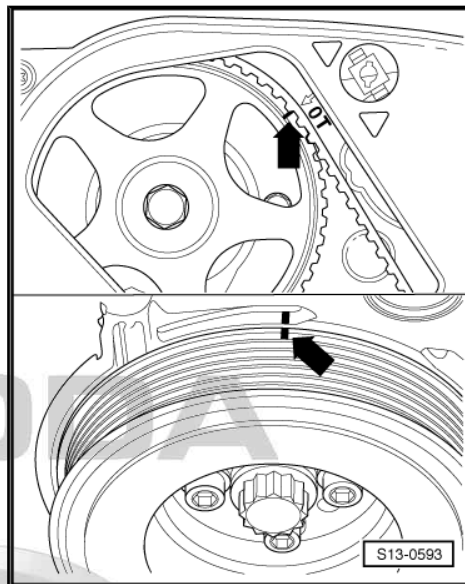
Tightening torque: 10 Nm + 90° further

- Start by rotating the camshaft and then the crankshaft in direction of rotation of engine to TDC for cylinder 1 -arrows-.

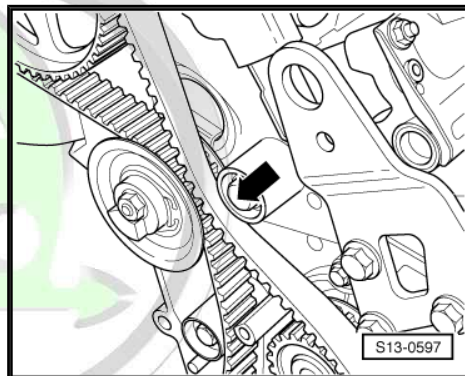


#### Note

*You can only see the TDC marking on the toothed belt guard with a mirror.*



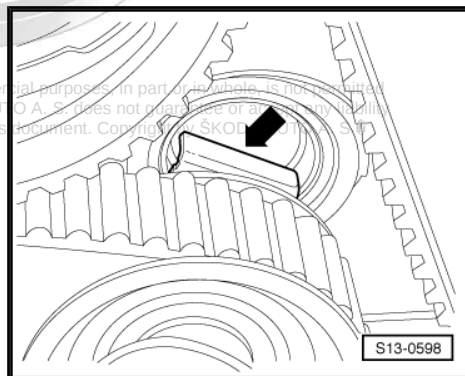
- Fit the toothed belts in the following order: Tensioning pulley, camshaft sprocket, coolant pump and then the idler roller -arrow-.



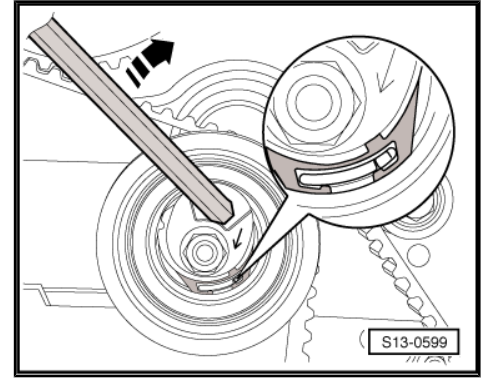
#### Note

*Check the tensioning pulley -arrow- is seated correctly in the cylinder head.*

**Tensioning toothed belt**



- Tighten the timing belt. To do so, turn the hexagon wrench on the eccentric to the right in -direction of arrow- until the notch is above the lug (toothed belt overtensioned).
- Then release the toothed belt again.
- Now tension the toothed belt until the notch and the lug are in line.
- Tighten securing nut to 23 Nm.
- Rotate crankshaft a further two revolutions in direction of rotation of engine until the engine is again positioned on TDC for cylinder 1. When doing this, it is important that the last 45° ( $\frac{1}{8}$  rotation) are rotated without any interruption.
- Once again inspect tension of toothed belt.
  - Specified value: Notch and lug are aligned.
- Check the TDC position again.



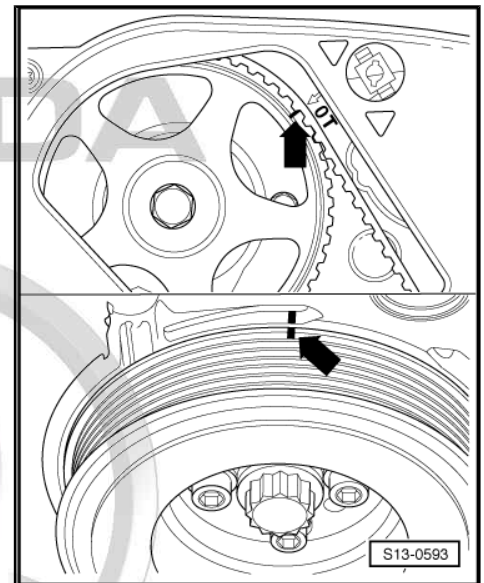
If the markings -arrows- are not aligned:



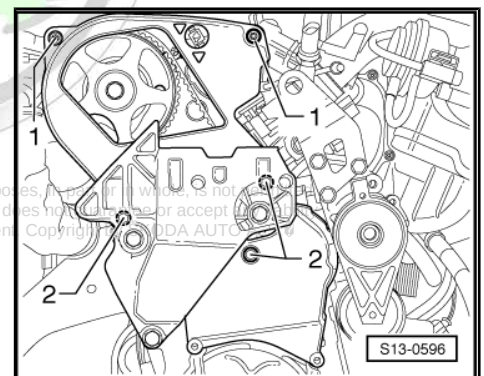
*You can only see the TDC marking on the toothed belt guard with a mirror.*

- Loosen the tensioning pulley and tension the toothed belt again.

If the markings are aligned -arrows-:



- Fit top toothed belt guard and tighten bolts -1-.
- Insert bolts -2- with a locking agent - D 000 600 A2- and tighten.
- Position the engine support bracket and tighten the bolts hand-tight.



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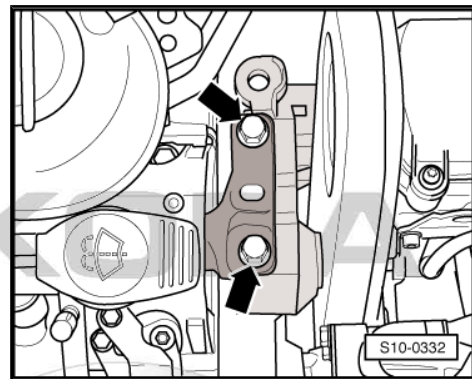
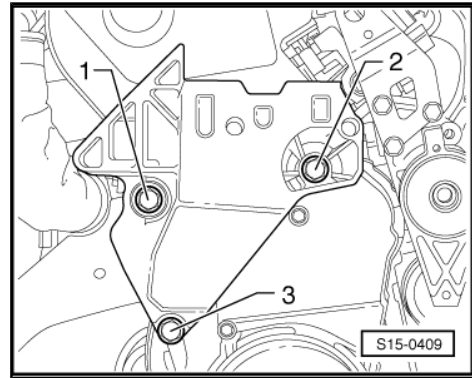


## Note

*Note the different bolt lengths. Bolt -3- is approx. 25 mm shorter than bolts -1- and -2-.*

- Lower the engine with the supporting device - T30099- until the bottom bolt -3- can be tightened.
- Tighten all screws to 45 Nm.
- Lower the engine into installation position.
- Insert the top bolt of the bottom toothed belt guard with locking agent - D 000 600 A2- and tighten all bolts of the bottom toothed belt guard.
- Install all the mounts for the engine; tightening torques ➔ [page 31](#) .
- Bolt the engine mount to the engine support bracket -arrows-. To do so, bring the contact surfaces into contact with the supporting device - T30099- .
- Checking and adjusting the assembly bracket ➔ [page 29](#) .

The further installation is carried out in reverse order to removal.



## 2.3 Removing and installing toothed belts, engines with split toothed belt guard



## Note

- ◆ Vehicles as of 10.2007 have a new toothed belt guard.
- ◆ Distinguishing feature: The top toothed belt guard does not have a cover ( ➔ [page 35](#) , Pos. 25) and the toothed belt guard is split in the area of the engine support bracket.
- ◆ Removing and installing toothed belt, engines without split toothed belt guard ➔ [page 40](#) .

## Special tools and workshop equipment required

- ◆ Supporting device - T30099-
- ◆ Base - T30099/1-
- ◆ Locking pin - T10060 A-
- ◆ Pliers for spring strap clamps
- ◆ Adapter - MP9-200/3 (10-222/3)- , only for engine identification characters BWA
- ◆ Hook for MP9-200 and T30099 - MP9-200/10 (10-222/10)- , only engine identification characters BWA
- ◆ Shackle - 10-222 A/12 (10-222/12)- (x3), only for engine identification characters BWA

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- ◆ Hose clamp up to Ø 25 mm - MP7-602 (3094)- , only engine identification characters BWA

### 2.3.1 Removing

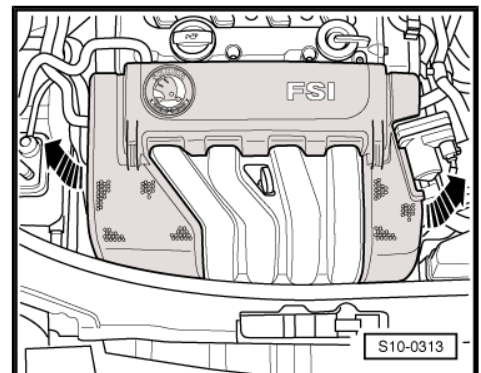


#### Note

- ◆ *Safety precautions when working on the fuel supply system* ⇒ [page 4](#) .
- ◆ *Observe cleanliness requirements when working on the fuel system* ⇒ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ**

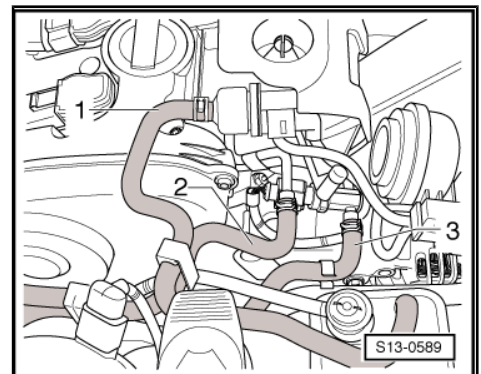
- Pull off engine cover upwards at the sides -arrows-.



- Disconnect hose to activated charcoal filter -1-.
- Detach the fuel feed line -2- and the fuel return-flow line -3-.

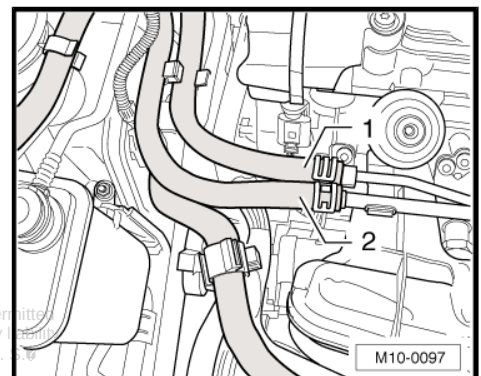
**Vehicles with engine identification characters BWA**

- Remove engine cover ⇒ [page 242](#) .
- Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .



- Mark hoses -1- and -2- and disconnect from the lines.

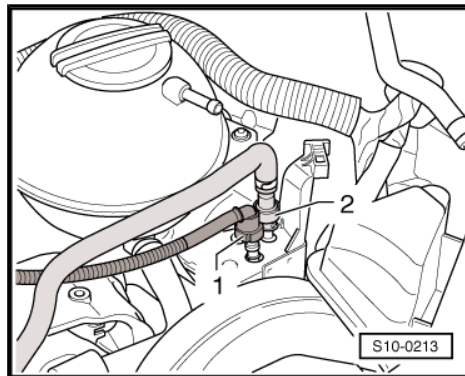
**Continued for all vehicles**



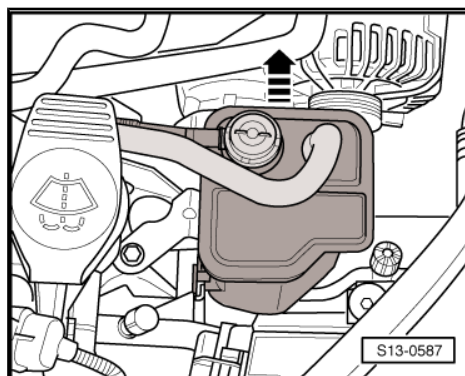




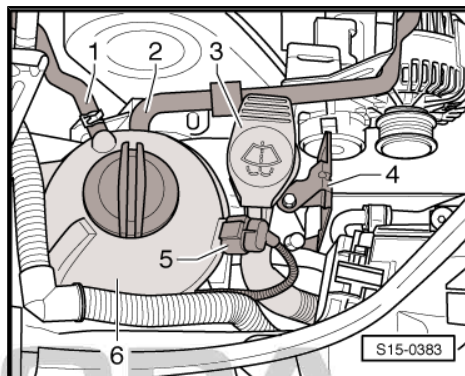
- Disconnect the vacuum line -1- and the fuel feed line -2- (press in the circlip). Lay the lines to the side.



- Pull activated charcoal filter with attached lines upwards out of the mounting bracket -arrow-.



- Unscrew bolts on filler neck for windshield washer fluid reservoir -3-.
- Unscrew bracket -4- for activated charcoal filter.
- Disconnect plug connection -5-.



#### WARNING

*Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*

- Open the cap of the expansion reservoir -6- to reduce the pressure in the cooling system.
- Then close the expansion reservoir again.
- Disconnect coolant hose -1- from expansion reservoir -6-.
- Unclip coolant hose -2- from the mounting.
- Detach expansion reservoir -6- and place on the engine with coolant hose attached -2-.

**Vehicles with engine identification characters BWA**





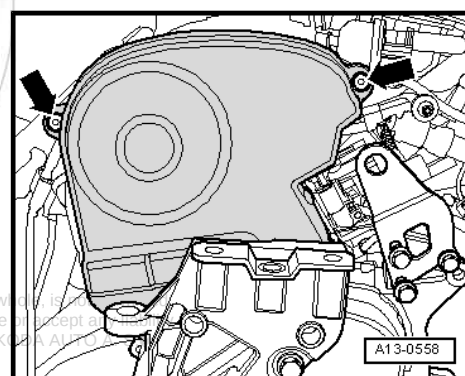
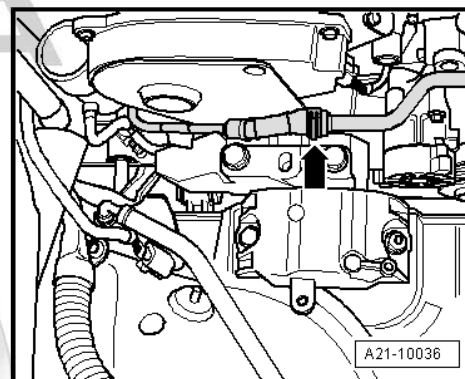
- Clamp off the coolant hose -arrow- using a hose clamp of up to Ø 25 mm - MP7-602- .
- Disconnect line on coolant pipe -arrow-.

Continued for all vehicles

- Unscrew the bolts -arrows- and remove the toothed belt guard from above.
- Remove V-ribbed belt ⇒ [page 39](#) .
- Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .

Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

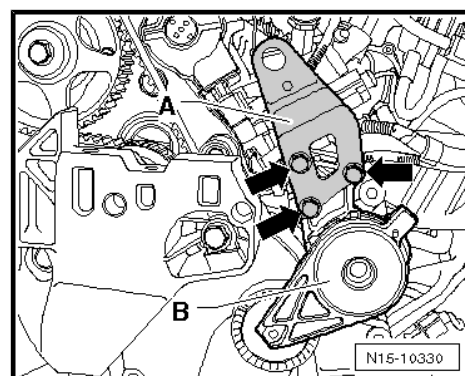
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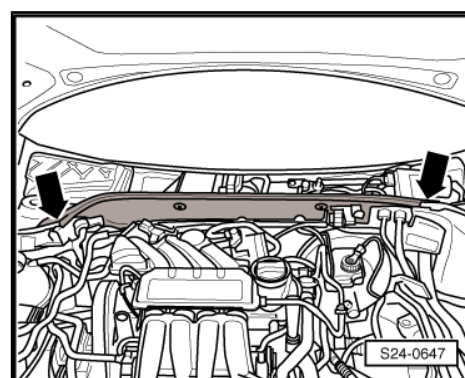
- Unbolt poly V-belt tensioner -B- and attach the lifting eye -A- to the bracket for auxiliary units with 3x M8 x 20 mm bolts.

Vehicles with engine identification characters BWA

- Remove V-ribbed belt tensioning device -arrows-.



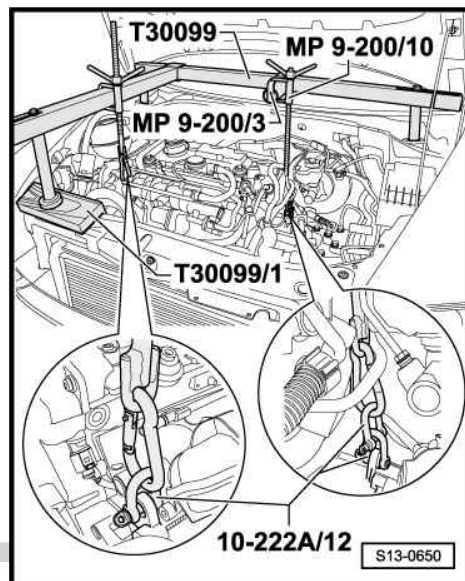
- Remove bulkhead plenum chamber.





- Replace supporting device - T30099- and mount the engine in installation position.
- Uniformly pre-tension the engine with both spindles, but do not raise.

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**



- Fit supporting device - T30099- with supporting plate - T30099/1- (not shown in illustration) and support engine in installation position.

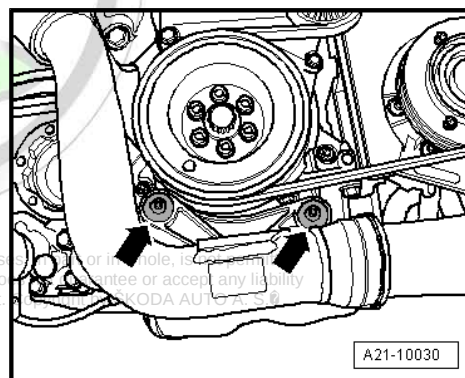
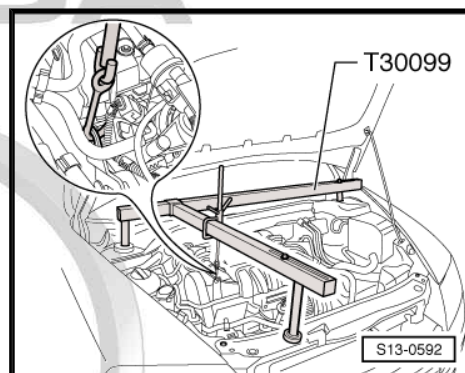
#### Continued for all vehicles

- Remove the sound dampening system ➔ Body Work; Rep. gr. 50 .
- Remove the front part of the front right wheelhouse liner ➔ Body Work; Rep. gr. 66 .

#### Vehicles with engine identification characters BWA

- Unscrew the bolts -arrows- and remove the charge air pipe with hoses.

#### Continued for all vehicles

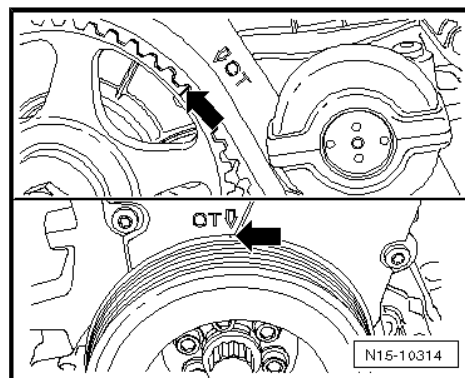


- Position camshaft sprocket to TDC marking for cylinder 1 by rotating at crankshaft.
- The marking on the camshaft sprocket must be aligned with the arrow on the toothed belt guard -arrows-.



#### Note

*You can only see the TDC marking on the toothed belt guard with a mirror.*

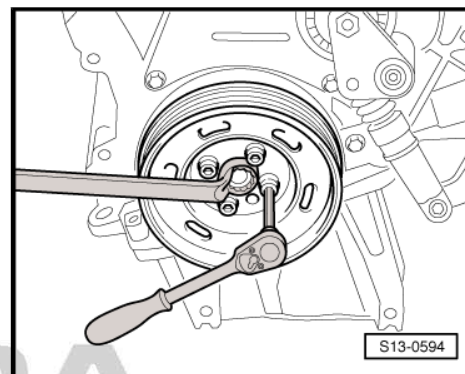


- Remove vibration damper/belt pulley.

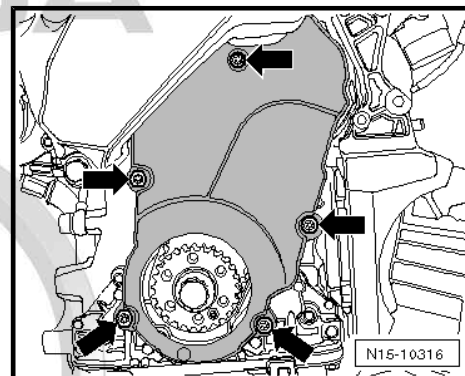


**Note**

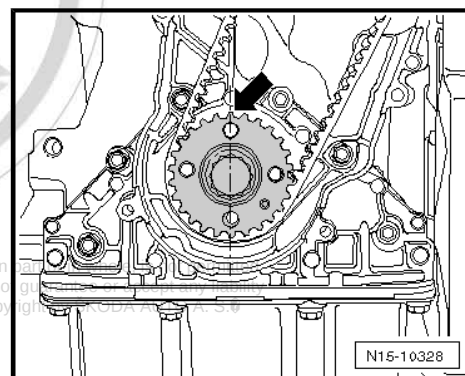
- ◆ *The TDC marking must be aligned before the vibration damper is removed.*
- ◆ *The crankshaft must not be turned until the TDC position is marked with a guide mark.*



- Unscrew the bottom bolts -arrows- from the bottom toothed belt guard.



- Mark the TDC -arrow-.

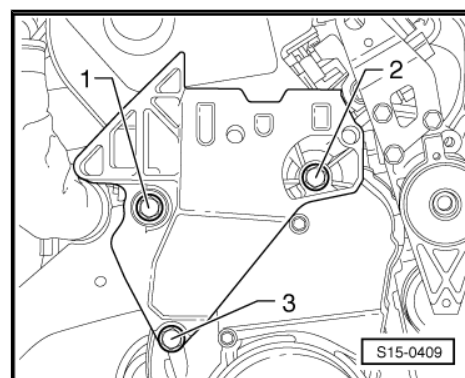


- Unscrew bottom bolt -3-.



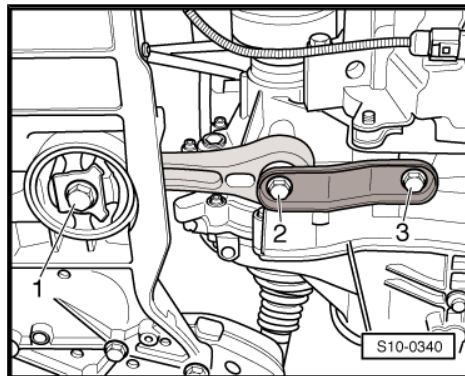
**Note**

*The next step is required in order to be able to raise the engine far enough.*





- Unscrew the screws -2- and -3- of the pendulum support.

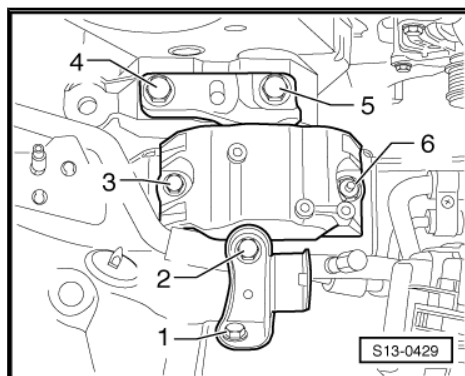


- Unscrew bolts -1- and -2- and remove the connecting cross-piece.
- Remove bolts -3- to -6- and remove engine mount.



### Note

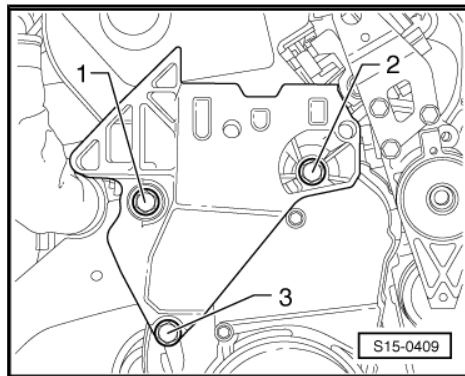
- ◆ *The assembly bracket must only be removed if the engine is supported with the supporting device - T30099- !*
- ◆ *Only release the engine support if the assembly bracket is removed.*



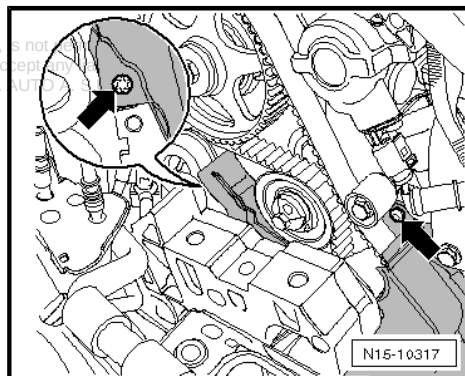
### Caution

***Make sure that no components/hoses/lines are damaged, overstretched or torn off when raising the engine with the supporting device - T30099- .***

- Only raise the engine with the supporting device - T30099- far enough for bolts -1 and 2- to be unscrewed and the engine support bracket to be pulled out.



- Unscrew the two top bolts from the bottom toothed belt guard -arrows- and remove the toothed belt guard down off the engine.
- Not remove the engine support bracket up off the engine.
- Mark the rotation direction of the timing belt.
- Slacken tensioning pulley and take off timing belt.
- Then turn crankshaft back slightly.





## 2.3.2 Install

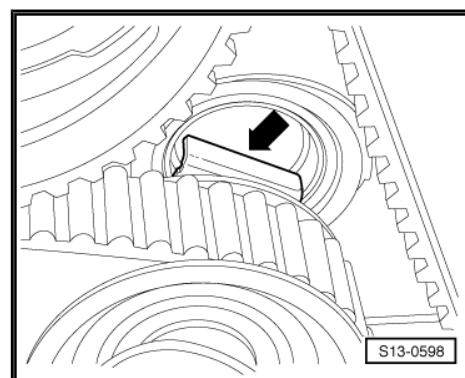
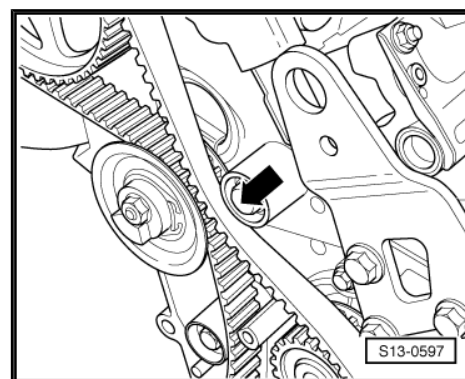
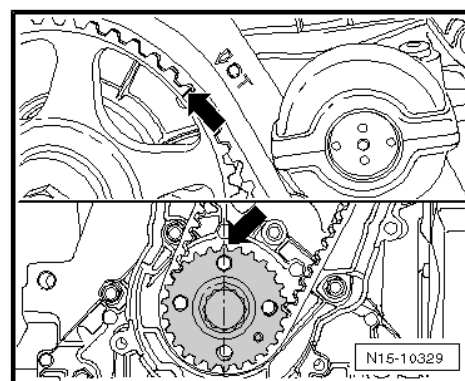
- The engine must be no more than warm to touch.



### Caution

*When rotating the camshaft, the crankshaft must not be positioned at TDC. Risk of damaging valves and piston crowns.*

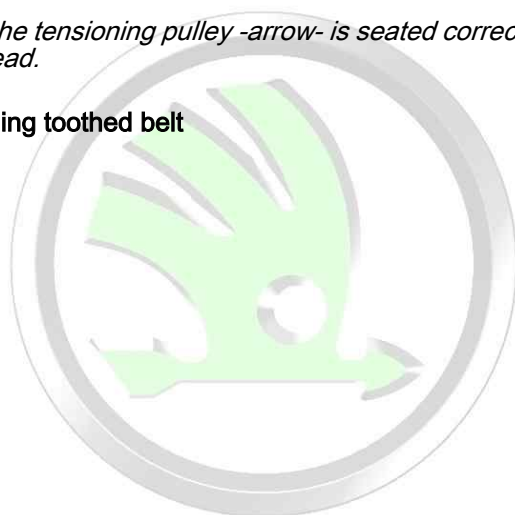
- Position the camshaft and crankshaft at the TDC markings.
- Fit timing belt onto the crankshaft timing belt sprocket (pay attention to direction of running).
- Fit the toothed belts in the following order: Tensioning pulley, camshaft sprocket, coolant pump and then the idler roller -arrow-.



### Note

*Check the tensioning pulley -arrow- is seated correctly in the cylinder head.*

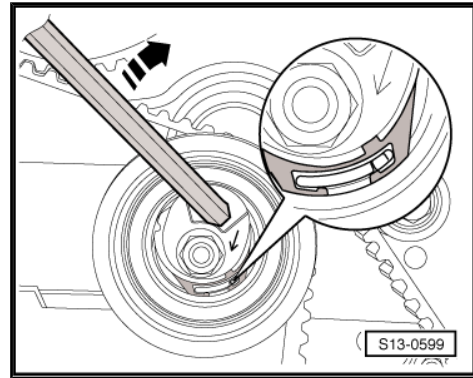
**Tensioning toothed belt**







- Tighten the timing belt. To do so, turn the hexagon wrench on the eccentric to the right in -direction of arrow- until the notch is above the lug (toothed belt overtensioned).
- Then release the toothed belt again.
- Now tension the toothed belt until the notch and the lug are in line.
- Tighten securing nut to 25 Nm.
- Rotate crankshaft a further two revolutions in direction of rotation of engine until the engine is again positioned on TDC for cylinder 1. When doing this, it is important that the last 45° (1/8 rotation) are rotated without any interruption.
- Once again inspect tension of toothed belt.
  - Specified value: Notch and lug are aligned.
- Check the TDC position again.

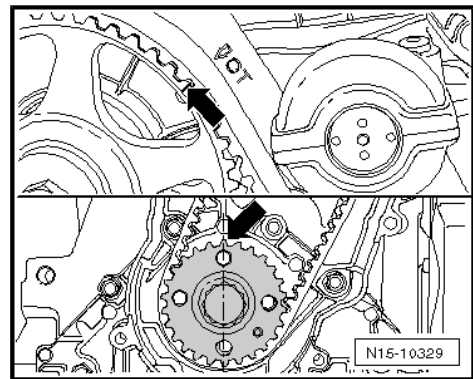


If the markings -arrows- are not aligned:

- Loosen the tensioning pulley and tension the toothed belt again.

If the markings are aligned -arrows-:

- Bring engine support bracket into the installation position.



**Note**

*Do not position the securing bolts of the engine support bracket yet. The engine support bracket must lay "loosely" between engine and frame side rail.*

- Install the bottom toothed belt guard from below -arrows-.



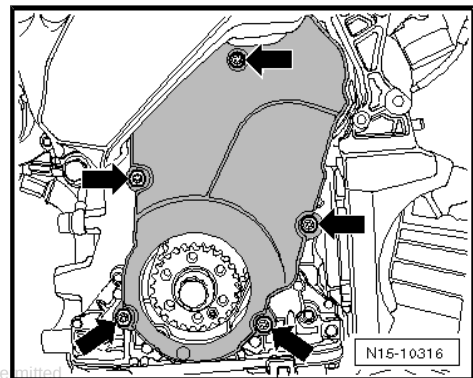
**Note**

*Insert the middle bolts of the bottom toothed belt guard with locking agent - D 000 600 A2- .*

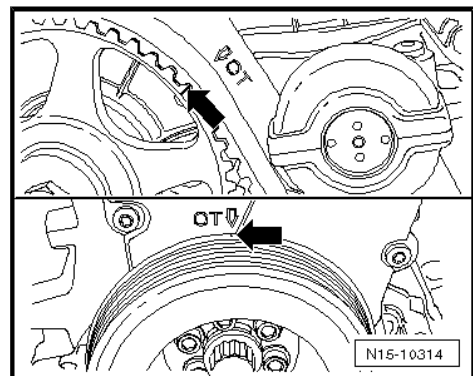
- Install vibration damper/belt pulley with new bolts.

Tightening torque for engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ: 10 Nm + 90° further

Tightening torque for engine identification characters BWA: 20 Nm + 90° further



- Check the TDC position again.
  - The markings must be aligned -arrows-.



- Tighten the two top bolts -arrows- of the bottom toothed belt guard.
- Fit the engine support bracket to the cylinder block and tighten the top bolts hand-tight.

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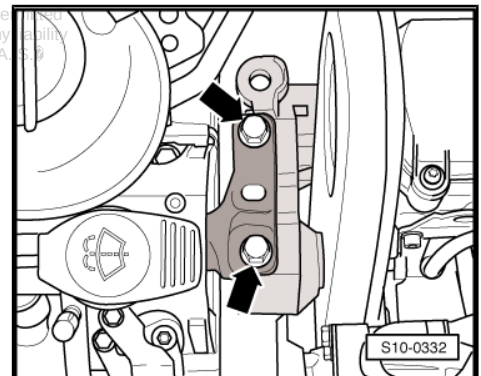
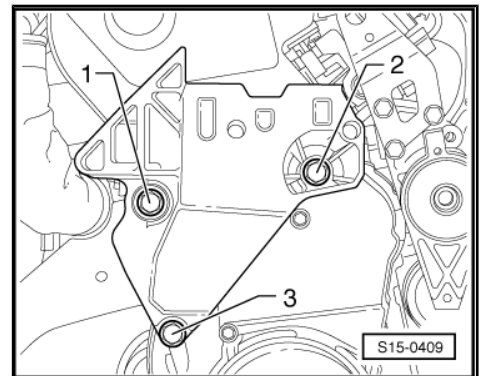
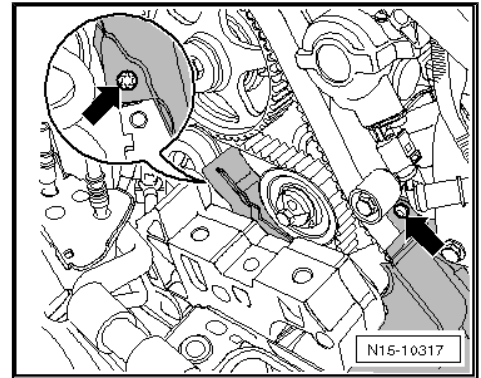


#### Note

*Note the different bolt lengths. Bolt -3- is approx. 25 mm shorter than bolts -1 and 2-.*

- Lower the engine with the supporting device - T30099- until the bottom bolt -3- can be tightened.
- Tighten all screws to 45 Nm.
- Lower the engine into installation position.
- Install all the mounts for the engine; tightening torques ⇒ [page 31](#) .
- Bolt the engine mount to the engine support bracket -arrows-. To do so, bring the contact surfaces into contact with the supporting device - T30099- .
- Checking and adjusting the assembly bracket ⇒ [page 29](#) .

The further installation is carried out in reverse order to removal.





### 3 Sealing flanges and flywheel/driver plate



#### Note

Repairs to the clutch ⇒ Gearbox; Rep. gr. 30.

#### 3.1 Summary of components

1 - 90 Nm + torque a further 90° (1/4 turn)

- ☐ replace

2 - Crankshaft toothed belt sprocket

3 - Diamond-coated washer

- ☐ Only installed for engine identification characters BWA

4 - 15 Nm

5 - Sealing ring for crankshaft on the belt pulley side

- ☐ Do not additionally lubricate or grease sealing lip of the gasket ring
- ☐ replace ⇒ [page 61](#)

6 - Sealing flange on the belt pulley side

- ☐ must be positioned on dowel pins
- ☐ removing and installing ⇒ [page 63](#)
- ☐ remove oil pan for removing and installing ⇒ [page 124](#)

7 - Cylinder block

- ☐ Removing and installing the balancing shaft module with oil pump ⇒ [page 127](#)
- ☐ removing and installing crankshaft ⇒ [page 70](#)
- ☐ Disassembling and assembling pistons and conrods ⇒ [page 72](#)

8 - 60 Nm + torque a further 90° (1/4 turn)

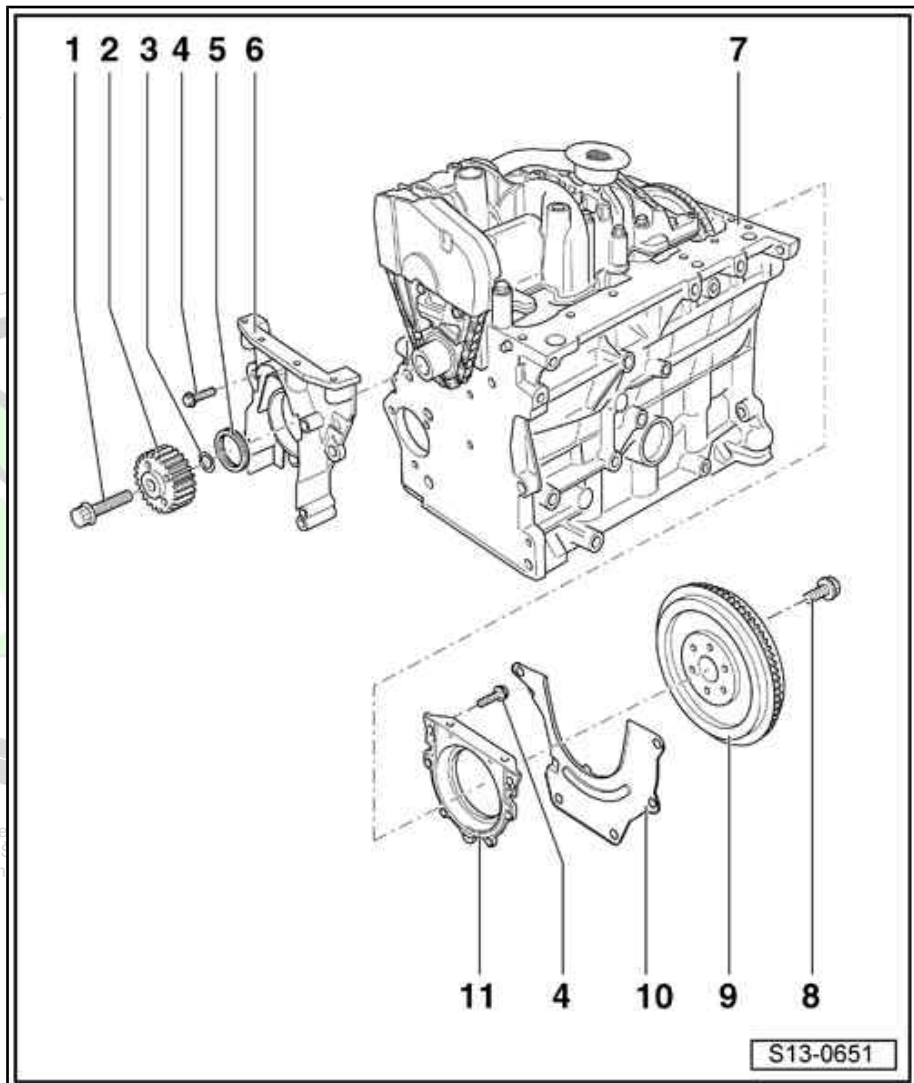
- ☐ replace

9 - Two-mass flywheel/driver disc

- ☐ removing and installing the two-mass flywheel ⇒ [page 67](#)
- ☐ removing and installing driver disc ⇒ [page 68](#)

10 - Intermediate plate

- ☐ must be positioned on dowel sleeves
- ☐ do not damage/bend during assembly work



## 11 - Sealing flange on the gearbox side

- ☐ with integrated gasket ring
- ☐ replace ⇒ [page 65](#)

## 3.2 Replacing crankshaft seal on belt pulley side

### Special tools and workshop equipment required

- ◆ Gasket ring extractor - MP1-226 (3203)-
- ◆ Counterholder - T30004 (3415)- or counterholder for toothed belt sprocket - MP1-310 (3099)-
- ◆ Assembly device - T10053-

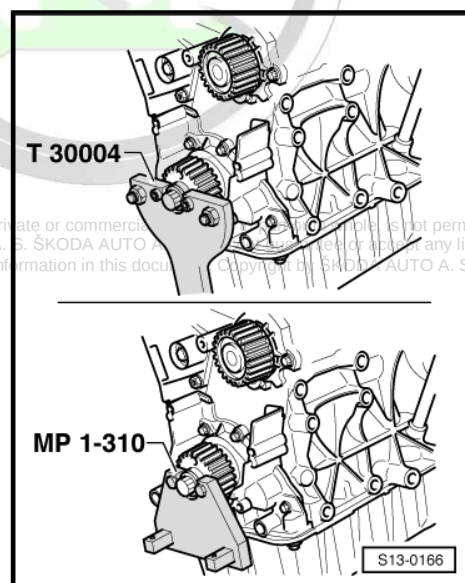
### Removing

- Remove toothed belt.
- ◆ Engines without split toothed belt guard: ⇒ [page 40](#)
- ◆ Engines with split toothed belt guard: ⇒ [page 50](#)
- Remove crankshaft - toothed belt sprocket. For this purpose, counterhold the toothed belt sprocket with counterholder - T30004- or lock with counterholder - MP1-310- .

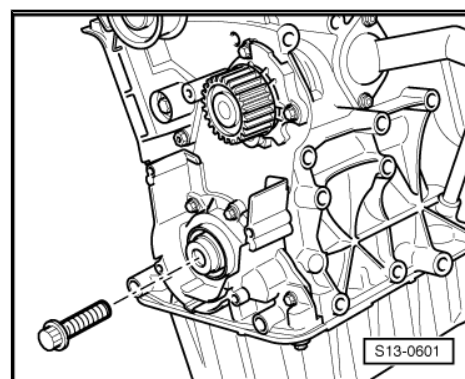


### Note

*A diamond-coated washer is installed between crankshaft toothed belt sprocket and crankshaft bearing pin in vehicles with engine identification characters BWA.*



- To guide the gasket ring extractor, screw central bolt by hand fully into the crankshaft.
- Unscrew inner part of the gasket ring extractor - MP1-226- nine turns (approx. 20 mm) out of the outer part and lock with knurled screw.



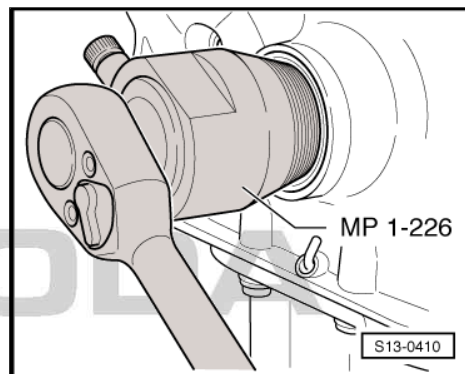




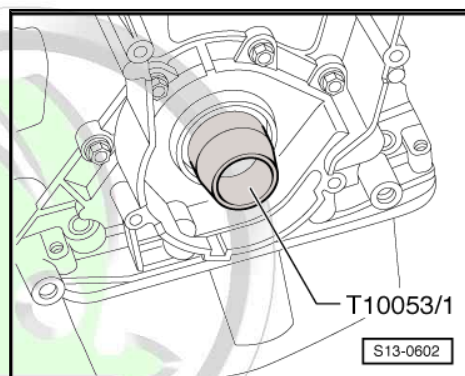
- Oil the thread head of the gasket ring extractor - MP1-226- , position and forcefully screw it into the gasket ring as far as possible.
- Release knurled screw and turn the inner side against the crankshaft until the gasket ring is pulled out.

#### Install

- Remove oil residue on the crankshaft bearing pin with a clean cloth.



- Insert guide bushing - T10053/1- on the crankshaft bearing pin.
- Slide dry sealing ring over the guide bushing onto the crankshaft bearing pin.

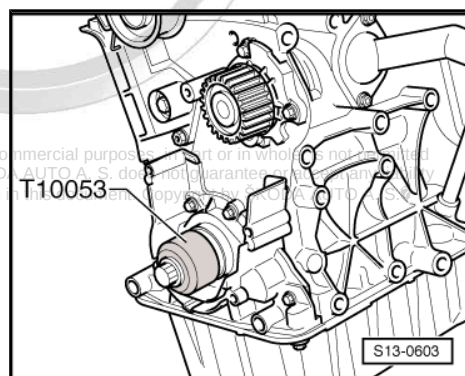


- Push in sealing ring with assembly device - T10053- and bolt - T10053/2- (M16 x 1.5 x 60) up to the stop.



#### Note

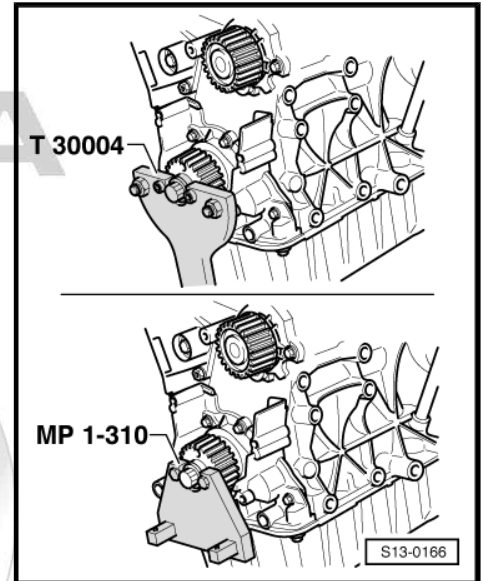
- ◆ *A diamond-coated washer is installed between crankshaft toothed belt sprocket and crankshaft bearing pin in vehicles with engine identification characters BWA.*
- ◆ *There must not be any oil present on contact surfaces between toothed belt sprocket, diamond-coated washer and crankshaft.*
- ◆ *Replace the centre bolt.*
- ◆ *Replace the diamond-coated washer (only engine identification characters BWA).*
- ◆ *Thread and shoulder must be free of oil and grease.*





- Install crankshaft toothed belt sprocket and counterhold with counterholder - T30004- or lock with counterholder - MP1-310- .
- Tighten new centre bolt to 90 Nm and torque a further 90° (1/4 turn). Tightening may occur in successive stages.

The further installation is carried out in reverse order to removal.



### 3.3 Removing and installing the sealing flange on the belt pulley side

#### Special tools and workshop equipment required

- ◆ Counterholder - T30004 (3415)- or counterholder for toothed belt sprocket - MP1-310 (3099)-
- ◆ Guide bushing - T10053/1-
- ◆ Silicone sealant - D 176 404 A2-
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.

#### Removing

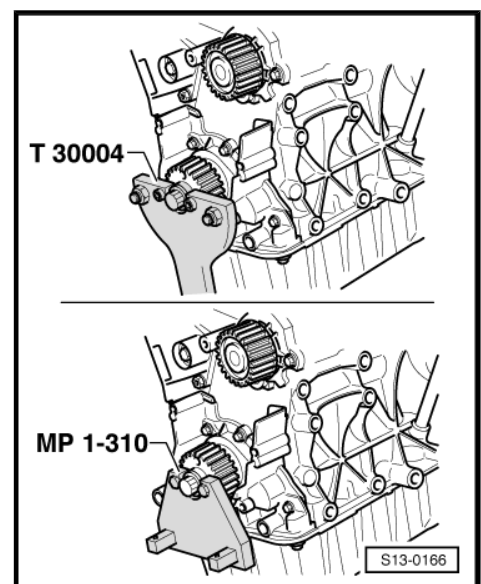
- Remove toothed belt.
- ◆ Engines without split toothed belt guard: ➔ [page 40](#)
- ◆ Engines with split toothed belt guard: ➔ [page 50](#)
- Remove crankshaft - toothed belt sprocket. For this purpose, counterhold the toothed belt sprocket with counterholder - T30004- or lock with counterholder - MP1-310- .



#### Note

*A diamond-coated washer is installed between crankshaft toothed belt sprocket and crankshaft bearing pin in vehicles with engine identification characters BWA.*

- Removing the oil pan ➔ [page 124](#) .





- Unbolt the front sealing flange -arrows-.
- Remove sealing flange, if necessary release by applying slight blows with a rubber-headed hammer.
- Drive out the gasket ring from the removed sealing flange.



### WARNING

***Wear protective gloves when working with sealant and grease remover.***

- Remove residual sealant on the sealing flange and on the cylinder block using a chemical sealant remover.
- Degrease all sealing surfaces.

### Install

- Before applying the sealant bead, cover over the sealing surface of the sealing ring with a clean cloth.
- Cut off nozzle tube at the front marking (Ø of nozzle approx. 3 mm).
- Apply a sealant bead of approx. 2-3 mm -arrows- to the clean sealing surface of the sealing flange, as shown.



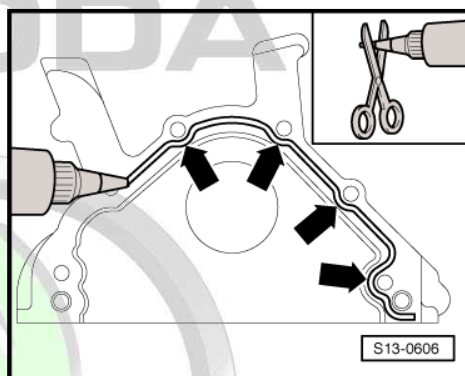
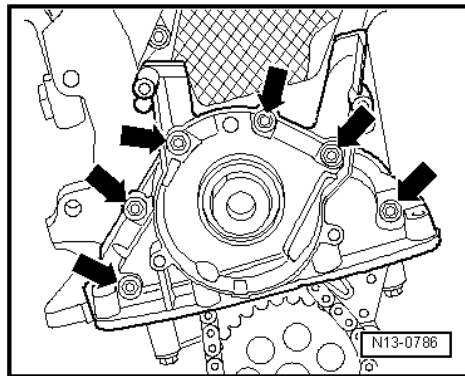
### Note

- ◆ *Pay attention to the use by date on sealant.*
- ◆ *The sealant bead must not be thicker than 2-3 mm, otherwise excess sealant may get into the oil pan and clog the strainer in the oil suction pipe.*
- ◆ *The sealing flange must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *When installing the sealing flange with the integrated sealing ring, use the guide bushing - T10053/1- .*
- ◆ *After installing, allow the sealant to dry for about 30 minutes. Only then may engine oil be filled in.*

- Fit sealing flange immediately and lightly tighten all bolts.
- Tighten the fixing screws of the sealing flange crosswise.

Tightening torque: 15 Nm

- Remove excess sealant. There must not be any sealant on the crankshaft bearing pin and the sealing surface of the sealing ring.
- Installing the oil pan ➔ [page 124](#) .
- Install a new sealing ring for the crankshaft belt pulley side ➔ [page 61](#) .



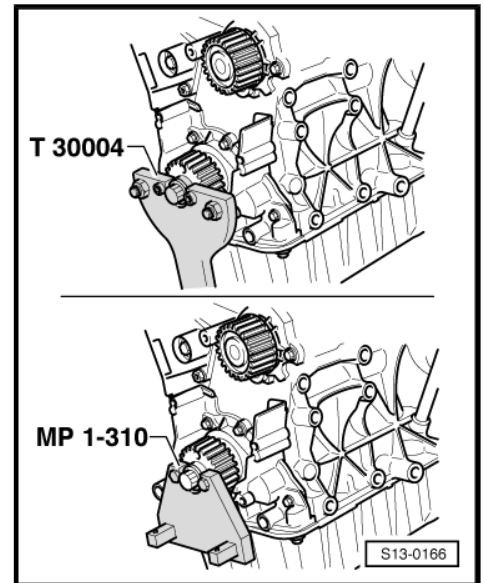
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- Install crankshaft toothed belt sprocket and counterhold with counterholder - T30004- or lock with counterholder - MP1-310- .

**i** Note

- ◆ A diamond-coated washer is installed between crankshaft toothed belt sprocket and crankshaft bearing pin in vehicles with engine identification characters BWA.
  - ◆ There must not be any oil present on the contact surface between toothed belt sprocket and crankshaft.
  - ◆ Replace the centre bolt.
  - ◆ Replace the diamond-coated washer (only engine identification characters BWA).
  - ◆ Thread and shoulder must be free of oil and grease.
- Tighten new centre bolt to 90 Nm and torque a further 90° (1/4 turn). Tightening may occur in successive stages.

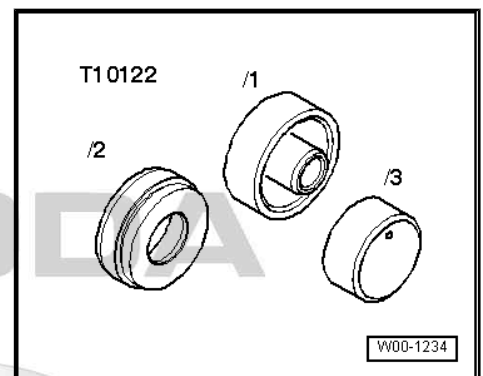
The further installation is carried out in reverse order to removal.



### 3.4 Replace sealing flange on the gearbox side

#### Special tools and workshop equipment required

- ◆ Assembly device - T10122-



#### Removing

- Remove two-mass flywheel or driver disc.
- ◆ Remove the two-mass flywheel: ➔ [page 67](#)
- ◆ Remove driver disc: ➔ [page 68](#)
- Removing the oil pan ➔ [page 124](#) .



- Unbolt sealing flange -arrows-.

### Install



#### Note

- ◆ *Do not grease or oil sealing lip of the sealing ring!*
- ◆ *The sealing flange sits on dowel pins.*
- Clean sealing surfaces. They must be free of oil and grease.
- Remove oil residue on the crankshaft bearing pin with a clean cloth.

### Sealing flange with support sleeve

- Install sealing flange.



#### Note

- ◆ *Use the support sleeve supplied for installation.*
- ◆ *The support sleeve may only be removed after the sealing flange has been pushed onto the crankshaft bearing pin.*

### Sealing flange without support sleeve

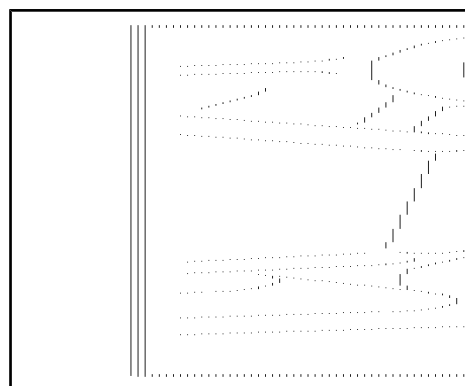
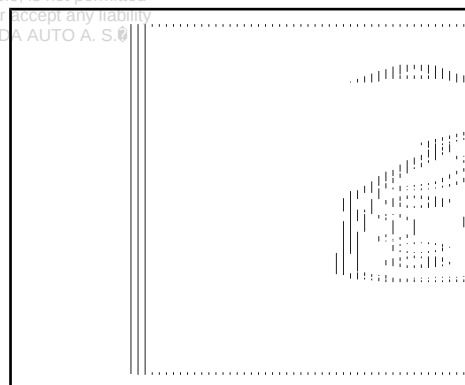
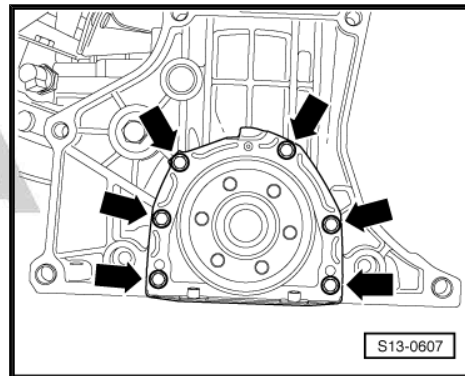
- Put together assembly sleeves -T10122/1- and -T10122/2- .

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- Slide the assembly sleeve onto the sealing flange -A- as shown.
- Separate the assembly sleeves.

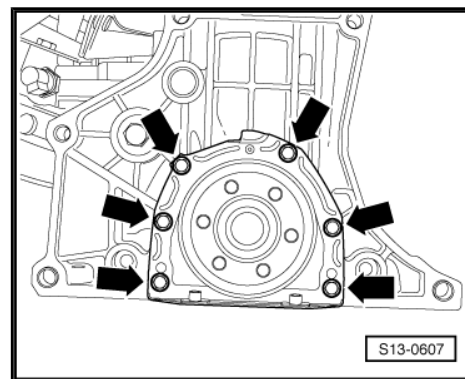
- Fit sealing flange -A- with the assembly sleeve -T10122/2- to the crankshaft and slide the sealing flange onto the crankshaft bearing pin.

### Complete installation



- Tighten the securing bolts to 15 Nm -arrows-.

The further installation is carried out in reverse order to removal.



### 3.5 Removing and installing the two-mass flywheel

#### Special tools and workshop equipment required

- ◆ Extractor - MP1-223 (3067)-

or

- ◆ Engine bracket - MP1-202 (VW 540)-

- ◆ Bushing - T30010 (VW 540/1B)-

- ◆ Counterholder - MP1-504-

#### Removing

- Gearbox removed.
- Remove the clutch ⇒ Gearbox ⇒ Rep. gr. 30 .

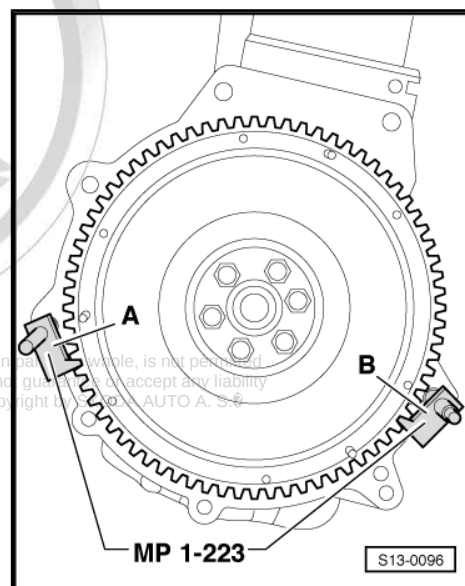
#### Engine installed

- Insert the counterholder - MP1-223 (3067)- into the bore hole on the cylinder block.

- Fitting position of the tool:

A - for tightening

B - for slackening



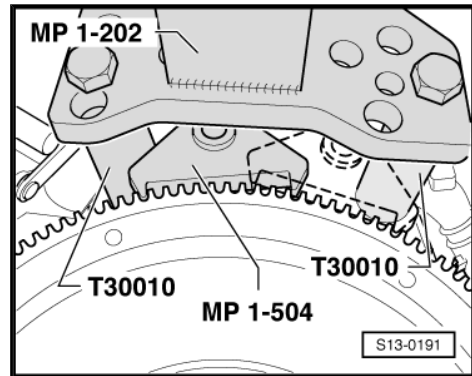
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## Engine removed

- Position the flywheel lock - MP1-504- on the starter ring gear and turn crankshaft until it rests against the sleeve - T30010- .



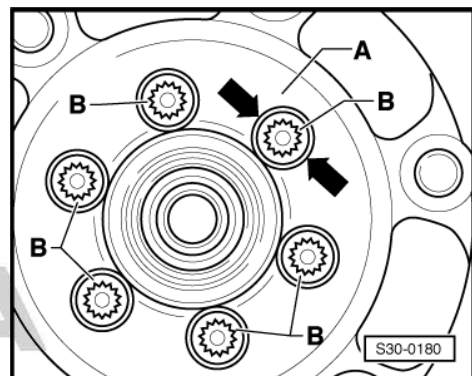
## Continued for all engines

- Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.



### Caution

*When unscrewing the screws -B-, ensure that no screw head catches on the secondary side -A- of the two-mass flywheel, otherwise it will be damaged.*



- Release screws -B- and remove two-mass flywheel.

## Install

Installation is carried out in the reverse order. When installing, observe the following:

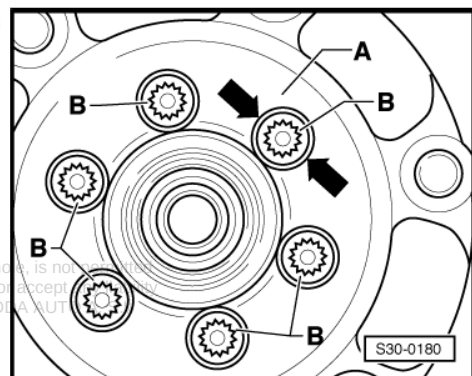


### Note

*Use new screws for attaching.*

- Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.

- Screw in all the screws -B- by hand.
- First of all tighten all the screws -B- crosswise to 60 Nm.
- Then torque all the screws -B- crosswise a further 90° (1/4 turn.)



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## 3.6 Removing and installing drive plate

### Special tools and workshop equipment required

- ♦ Flywheel lock - MP1-221 (VW 558)-
- ♦ Depth gauge
- ♦ Hexagon bolt - M8 × 45-
- ♦ Two hexagon nuts - M10-

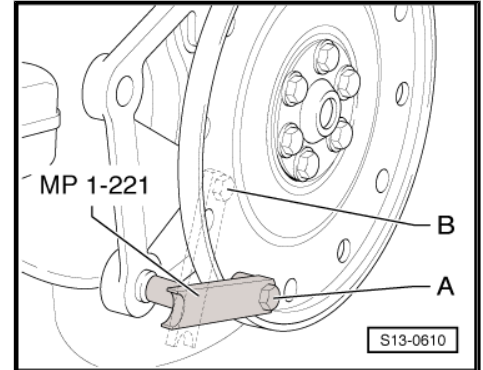
## Remove drive plate

- Remove gearbox ⇒ Gearbox; Rep. gr. 37 .
- Attach the counterholder - MP1-221- to the drive plate with hexagon bolt - M8 × 45- . Insert two hexagon nuts - M10- between the counterholder and drive plate.

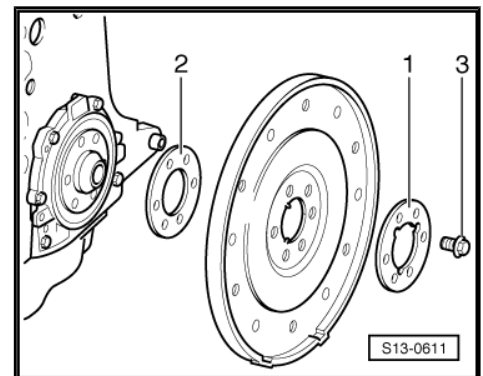
Fitting position of the tool:

- A- to loosen
- B- to tighten

## Installing the drive plate



- Fit the drive plate using the washer with recesses -1- (without compensating washer -2-).
- Insert new bolts -3- and tighten to 30 Nm.



- Check dimension -a- in three points and determine the mean value.

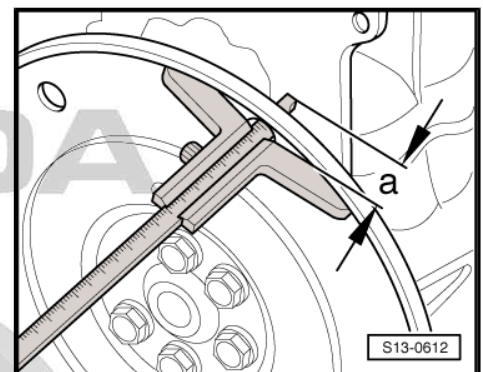
Specified value: 19.5...21.1 mm



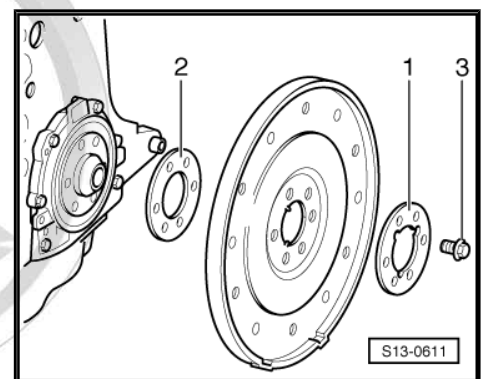
### Note

*The measurement is made through the hole of the drive plate to the milled surface of the cylinder block.*

If the measurement is less than the specification:



- Remove driver disc again and also use compensating washer -2-. Tighten screws -3- to 30 Nm again.
- Tighten screws -3- to 60 Nm and torque a further 90° (1/4 turn) (the tightening may occur in several stages).





## 4 Crankshaft

### 4.1 Summary of components



#### Note

*If considerable quantities of metal swarf or grit are found in the oil or engine when carrying out repairs, this may that the crankshaft or conrod bearings are damaged. To avoid secondary damage, after the repair perform the following tasks:*

- Carefully clean the oil galleries.
- Replace oil injection nozzles.
- Replace engine oil cooler.
- Replace oil filter element.

#### 1 - 65 Nm + torque a further 90° (<sup>1</sup>/<sub>4</sub> turn)

- ☐ replace
- ☐ tighten thread

#### 2 - Bearing caps

- ☐ Bearing cover 1: Belt pulley end
- ☐ retaining lugs of the bearing shells of the cylinder block/bearing cap must be on top of one another

#### 3 - 10 Nm + torque a further 90° (<sup>1</sup>/<sub>4</sub> turn)

- ☐ replace

#### 4 - Rotor

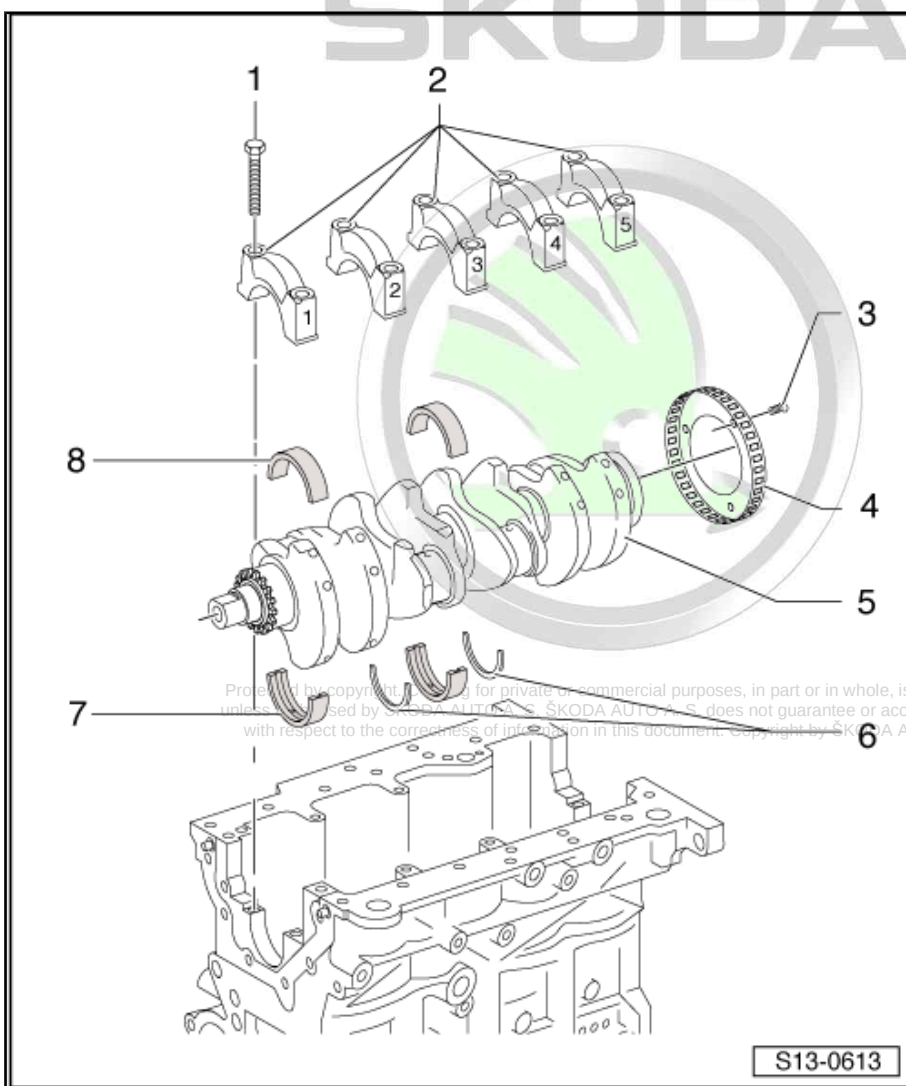
- ☐ For engine speed sender - G28- .
- ☐ replace the sensor rotor each time the bolts are slackened
- ☐ assembly only possible in one position -holes offset-
- ☐ removing and installing  
⇒ [page 71](#)

#### 5 - Crankshaft

- ☐ New axial clearance:  
0.07...0.23 mm
- Wear limit: 0.30 mm
- ☐ Crankshaft bearing journals:  $\varnothing$  54.00 mm
- ☐ Conrod bearing journals:  $\varnothing$  47.80 mm

#### 6 - Thrust washers

- ☐ for bearing 3



## 7 - Bearing shell for cylinder block

- ☐ with lubricating groove
- ☐ do not mix up used bearing shells (mark)
- ☐ Identification ➔ [page 71](#)

## 8 - Bearing shell for bearing cap

- ☐ without lubricating groove
- ☐ do not mix up used bearing shells (mark)
- ☐ Identification ➔ [page 71](#)

## Removing and installing sensor rotor



### Note

*Before removing the crankshaft, ensure a suitable place is available for placing it down so that the sensor rotor does not rest on anything or get damaged.*

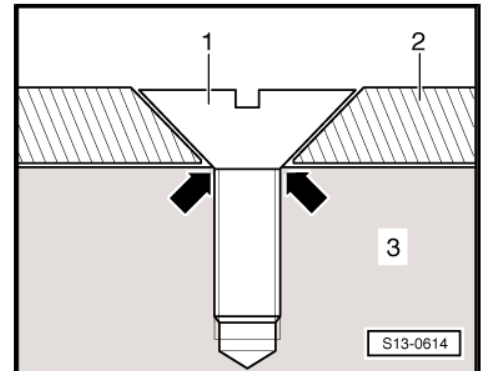
- Always replace the sensor rotor -2- each time the bolts -1- are slackened.



### Note

- ◆ *After the sensor rotor is screwed on once again, the attachment points of the recess head screws are misshaped in such a way that the bolt heads rest against the crankshaft -3- -arrows- and the sensor rotor is positioned loosely below the screws.*

- ◆ *It is only possible to install the sensor rotor in one position, the holes are offset.*

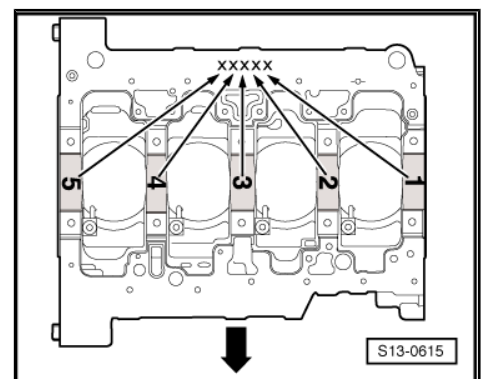


## Assign crankshaft bearing shells to the cylinder block

The upper bearing shells are allocated to the cylinder block with the right thickness at the works. Coloured points on the bearing shell are used to mark the bearing shell thickness.

The bearing shell is to be used at the location which is marked with letters, on the lower sealing surface of the cylinder block.

| Letter on the cylinder block |   | Colour of the support |
|------------------------------|---|-----------------------|
| B                            | = | Blue                  |
| G                            | = | yellow                |
| W                            | = | white                 |



### Note

- ◆ *The -arrow- shows the direction of travel.*
- ◆ *If the coloured points are no longer legible, use the blue bearing shell.*
- ◆ *The bottom crankshaft bearing shells are always supplied as replacement parts with the colour coding "yellow".*

## 5 Pistons and conrods

### 5.1 Summary of components

#### 1 - Conrod bolt, 30 Nm + torque a further + 90° (1/4 turn)

- ☐ replace
- ☐ Oil thread and contact surface

#### 2 - Pressure valve, 27 Nm

- ☐ Opening pressure: 0.13...0.16 MPa (1.3...1.6 bar)

#### 3 - Oil injection nozzle

- ☐ for cooling pistons

#### 4 - Conrod bearing cap

- ☐ Check installation position
- ☐ as a result of the conrods separated in the cracking process, the cover fits only in one position and only to the relevant conrod
- ☐ mark assignment to cylinder -B-
- ☐ Fitting position: markings -A- point toward belt pulley side

#### 5 - Bearing shell

- ☐ Note installation position ⇒ [page 73](#)
- ☐ do not mix up used bearing shells

#### 6 - Conrod

- ☐ with a split bearing cap
- ☐ separate new conrod ⇒ [page 75](#)
- ☐ Renew as set only.
- ☐ mark assignment to cylinder -B-
- ☐ Fitting position: markings -A- point toward belt pulley side
- ☐ New axial clearance: 0.10...0.35 mm

Wear limit: 0.4 mm

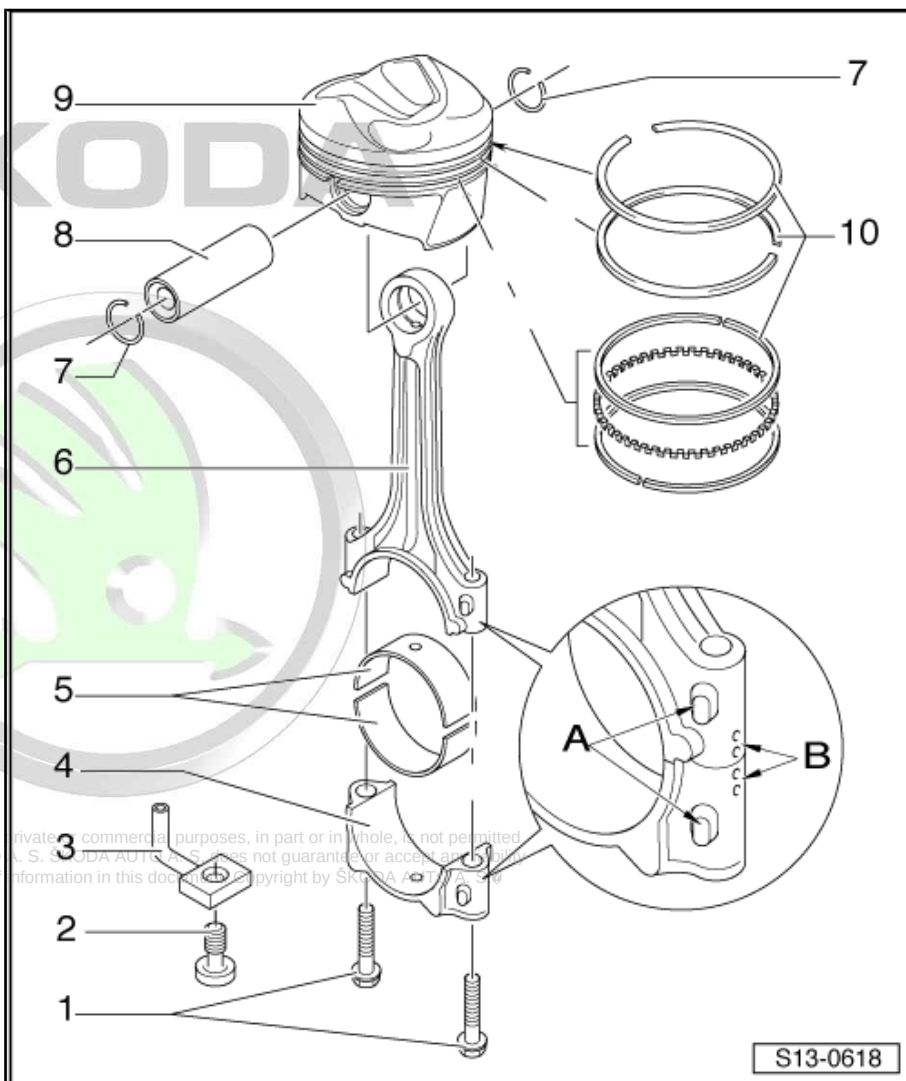
#### 7 - Circlip

#### 8 - Piston pin

- ☐ if stiff, heat piston to approx. 60°C
- ☐ use drift - VW 222 A- for removing and installing

#### 9 - Piston

- ☐ different versions by engine identification characters; note part number
- ☐ mark installation position and matching cylinder
- ☐ arrow on the piston crown faces towards the belt pulley side





- ☐ use piston ring tensioning strap for installing
- ☐ check ➔ [page 74](#)
- ☐ inspect cylinder bore ➔ [page 74](#)
- ☐ Piston Ø: 82.465 mm (nominal dimension)
- ☐ Cylinder Ø: 82.51 mm (nominal dimension)

## 10 - Piston rings

- ☐ Offset joint 120°
- ☐ use piston ring pliers for removing and installing
- ☐ Markings to piston crown
- ☐ Vehicles with engine identification characters BWA: 2-part oil scraper ring
- ☐ Inspect gap clearance ➔ [page 73](#)
- ☐ Inspect end clearance ➔ [page 74](#)

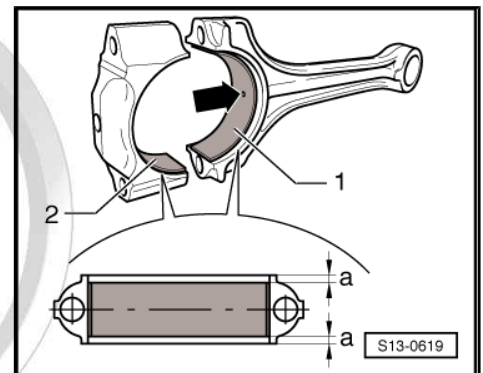
### Bearing shell installation position

Bearing shell -1- with oil drilling -arrow- for conrod.

Bearing shell -2- without oil drilling for conrod bearing cap.

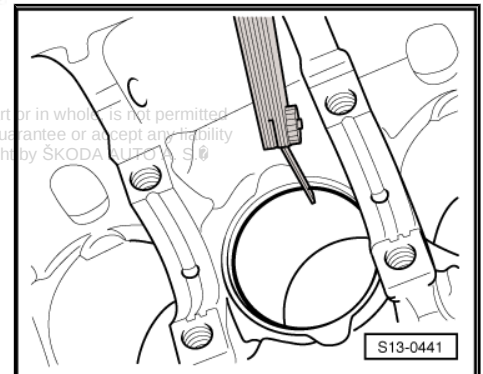
- Insert bearing shells in the connecting rod and in the connecting rod bearing cap centred.

The dimension -a- must be the same on the right and left.



## 5.2 Inspect piston, piston rings and cylinder bore

### Inspecting piston ring gap clearance



### Special tools and workshop equipment required

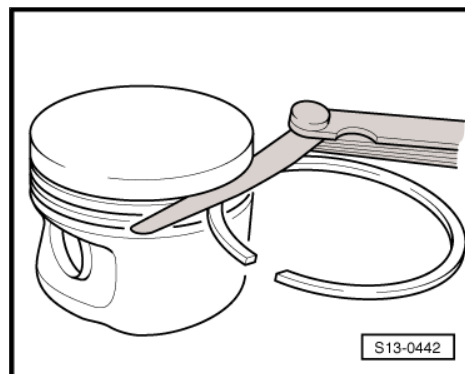
#### ◆ Feeler gauges

- Push ring squarely from above down into cylinder bore to approx. 15 mm from bottom end of cylinder.

| Piston ring      |    | Gap clearance |            |
|------------------|----|---------------|------------|
|                  |    | New           | Wear limit |
| Gasket rings     | mm | 0,20...0,40   | 0,8        |
| Oil scraper ring | mm | 0,25...0,50   | 0,8        |



## Inspect piston ring end clearance



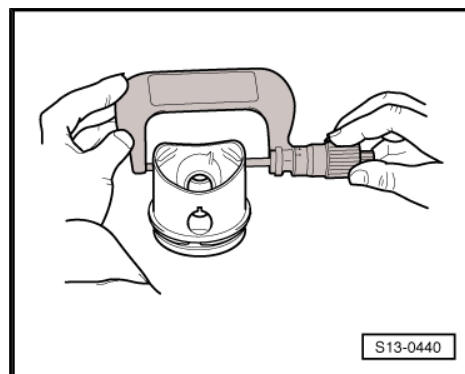
### Special tools and workshop equipment required

- ◆ Feeler gauges
- Clean before inspecting the annular grooves of the piston.

| Piston ring      |    | End clearance |            |
|------------------|----|---------------|------------|
|                  |    | New           | Wear limit |
| Gasket rings     | mm | 0,06...0,09   | 0,20       |
| Oil scraper ring | mm | 0,03...0,06   | 0,15       |

### Inspecting pistons

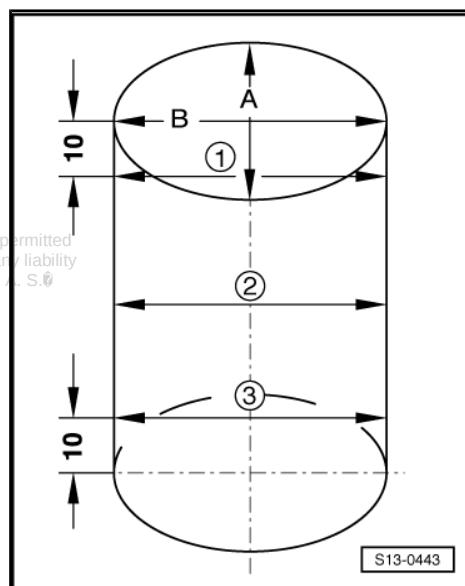
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### Special tools and workshop equipment required

- ◆ External micrometer 75...100 mm
- Measure about 10 mm from the lower edge and vertically offset to piston pin axis.
- Deviations from specified dimension: max.: 0.04 mm

### Inspecting cylinder bore



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### Special tools and workshop equipment required

- ◆ Internal precision measuring instrument 50...100 mm
- Measure at three points crosswise in a transverse direction -A- and lengthwise -B-.
- Deviations from specified dimension: max.: 0.08 mm

#### Note

*Do not measure the cylinder bore if the cylinder block is fixed to the assembly stand - MP1-202- with the engine mount - MP9-101- , as this may result in incorrect measurements.*

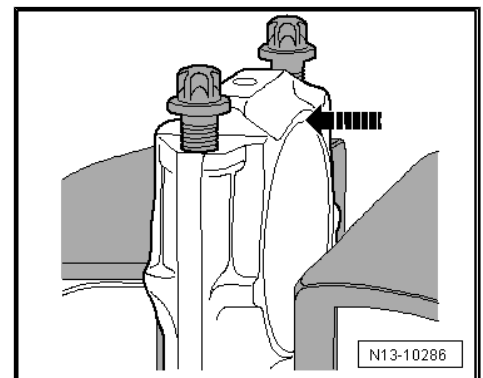
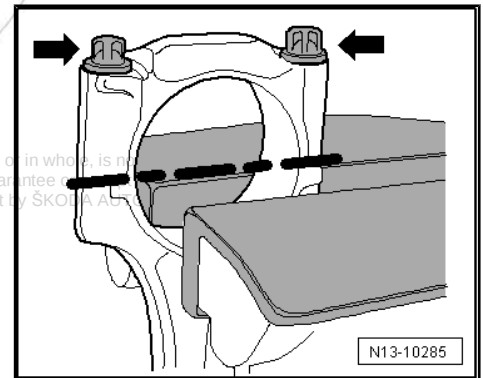
## 5.3 Separating new conrod

It can happen that on new connecting rods, the provided separation point is not completely cracked. If the conrod bearing cap cannot be removed by hand, proceed in the following manner:

- Mark the assignment of the conrod to the cylinder.
- Slightly clamp the connecting rod, as shown in the illustration, in a vice provided with aluminium protective jaws.

#### Note

- ◆ *Only tension the connecting rod slightly in order to avoid damage.*
- ◆ *The conrod is clamped below the broken line.*
- Unscrew both screws -arrows- by approx. 5 turns.
- Knock against the conrod bearing cap with a plastic hammer in -direction of arrow- in order to loosen it.





## 15 – Cylinder head, valve gear

### 1 Cylinder head - summaries of components

Testing compression pressure ⇒ [page 89](#) .

Removing and installing toothed belt:

- ◆ Engines without split toothed belt guard ⇒ [page 40](#) .
- ◆ Engines with split toothed belt guard ⇒ [page 50](#) .



#### Note

- ◆ *If an exchange cylinder head is installed, all the contact surfaces between the supporting elements, roller rocker fingers and the cam tracks must be oiled before the assembly of the cylinder head cover.*
- ◆ *Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.*
- ◆ *Replace cylinder head bolts.*
- ◆ *If the cylinder head is replaced, the system must also be completely filled with fresh coolant.*

#### 1.1 Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ - summary of components

# 1 - Cylinder head bolt

- ☐ replace
- ☐ pay attention to sequence for loosening and tightening  
⇒ [page 82](#)
- ☐ Tightening torque:  
⇒ [page 88](#)

2 - 10 Nm

# 3 - Cylinder head cover

- ☐ order of tightening  
⇒ [page 78](#)

# 4 - Gasket

- ☐ replace if damaged or leaking

# 5 - Gasket for cylinder head cover

- ☐ replace if damaged or leaking

# 6 - Support

# 7 - Screw cap

8 - 4 Nm

# 9 - Inlet camshaft control valve

1 - N205-

- ☐ removing and installing  
⇒ [page 112](#)

# 10 - Gasket

- ☐ replace

# 11 - bracket for wire harness

# 12 - Housing

# 13 - Gasket

- ☐ replace

# 14 - Lifting eye

15 - 25 Nm

# 16 - Pin screw, 10 Nm

- ☐ for the intake manifold

# 17 - Divider plate

# 18 - Cylinder head gasket

- ☐ replace
- ☐ Replace cylinder head gasket ⇒ [page 82](#)
- ☐ check fitting position: the part number faces the cylinder head

# 19 - Hall sender - G40-

# 20 - Sealing ring

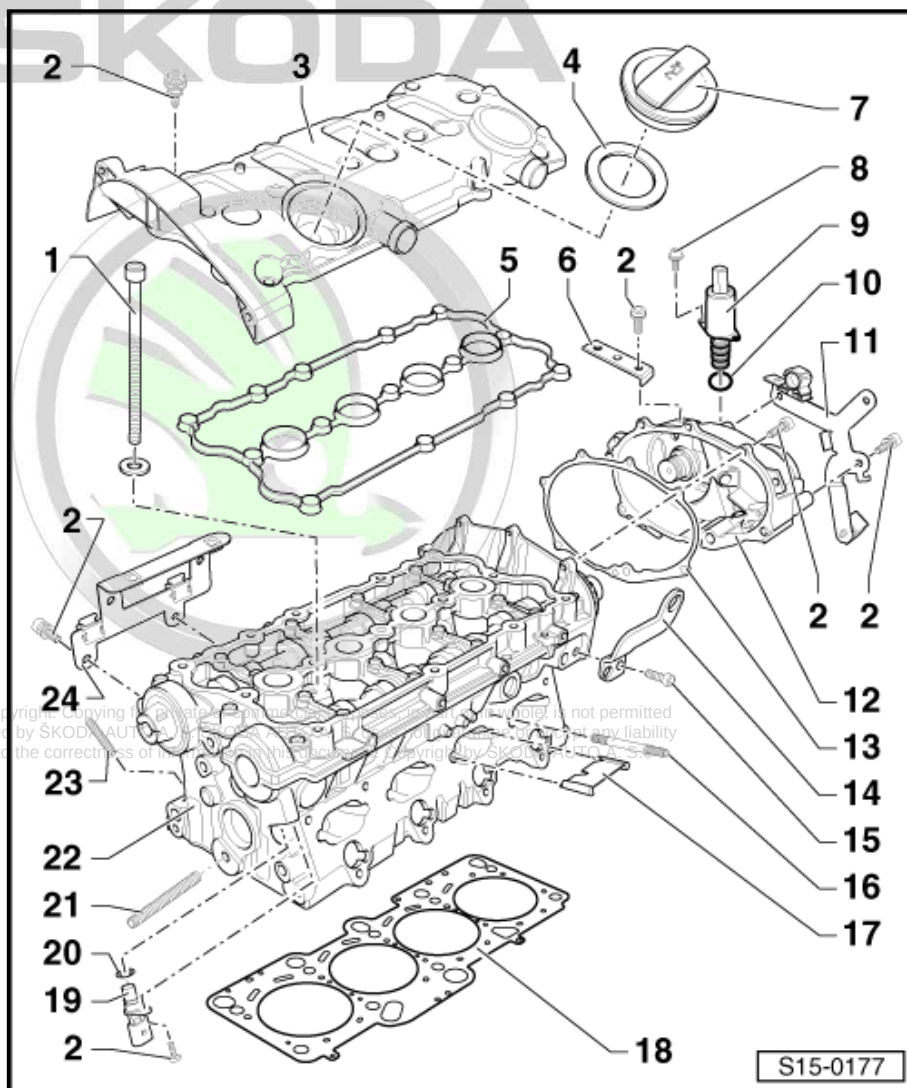
- ☐ replace if damaged

# 21 - Pin screw, 10 Nm

- ☐ for the tensioning roller

# 22 - Cylinder head

- ☐ removing and installing ⇒ [page 82](#)







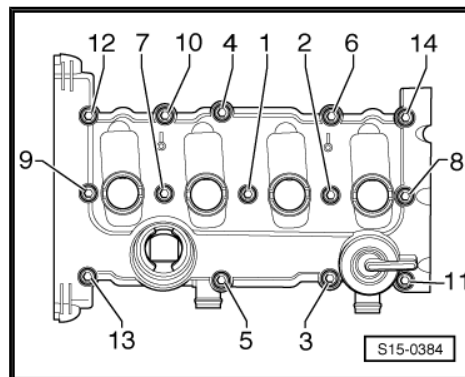
- ☐ Checking cylinder head for distortion ➔ [page 78](#)

### 23 - Pin screw, 20 Nm

- ☐ for exhaust manifold
- ☐ coat with hot bolt paste - G 052 112 A3-

### 24 - Support

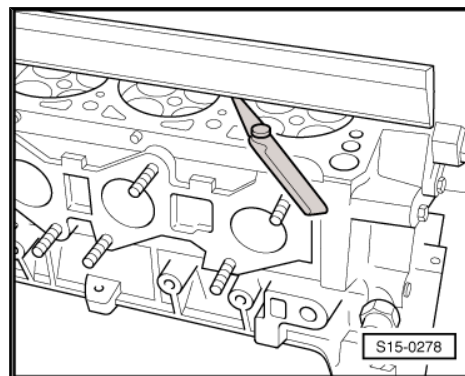
### Tightening sequence, cylinder head cover



### Inspecting the cylinder head for distortion

- Inspect cylinder head at several points for distortion using a knife-edge straightedge and feeler gauge.
- Max. permissible distortion: 0.05 mm

If this value is exceeded, the cylinder head must be replaced.  
Reworking of the sealing surface is not allowed.



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## 1.2 Engine identification characters BWA - summary of components

1 - 10 Nm

2 - Cylinder head cover

- ☐ order of tightening  
⇒ [page 78](#)

3 - Gasket

- ☐ replace if damaged or leaking

4 - Slide valve body

5 - Screw cap

6 - Gasket

- ☐ replace if damaged or leaking

7 - 4 Nm

8 - Gasket for cylinder head cover

- ☐ replace if damaged or leaking

9 - Vacuum pump

10 - Inlet camshaft control valve 1 - N205-

- ☐ removing and installing  
⇒ [page 113](#)

11 - Sealing ring

- ☐ replace

12 - Cable strap

13 - Sealing ring

- ☐ replace if damaged or leaking

14 - Housing

15 - Gasket

- ☐ replace

16 - Ball head, 3.5 Nm

- ☐ for engine cover

17 - Lifting eye - on the left

18 - 25 Nm

19 - Pin screw, 10 Nm

- ☐ for the intake manifold

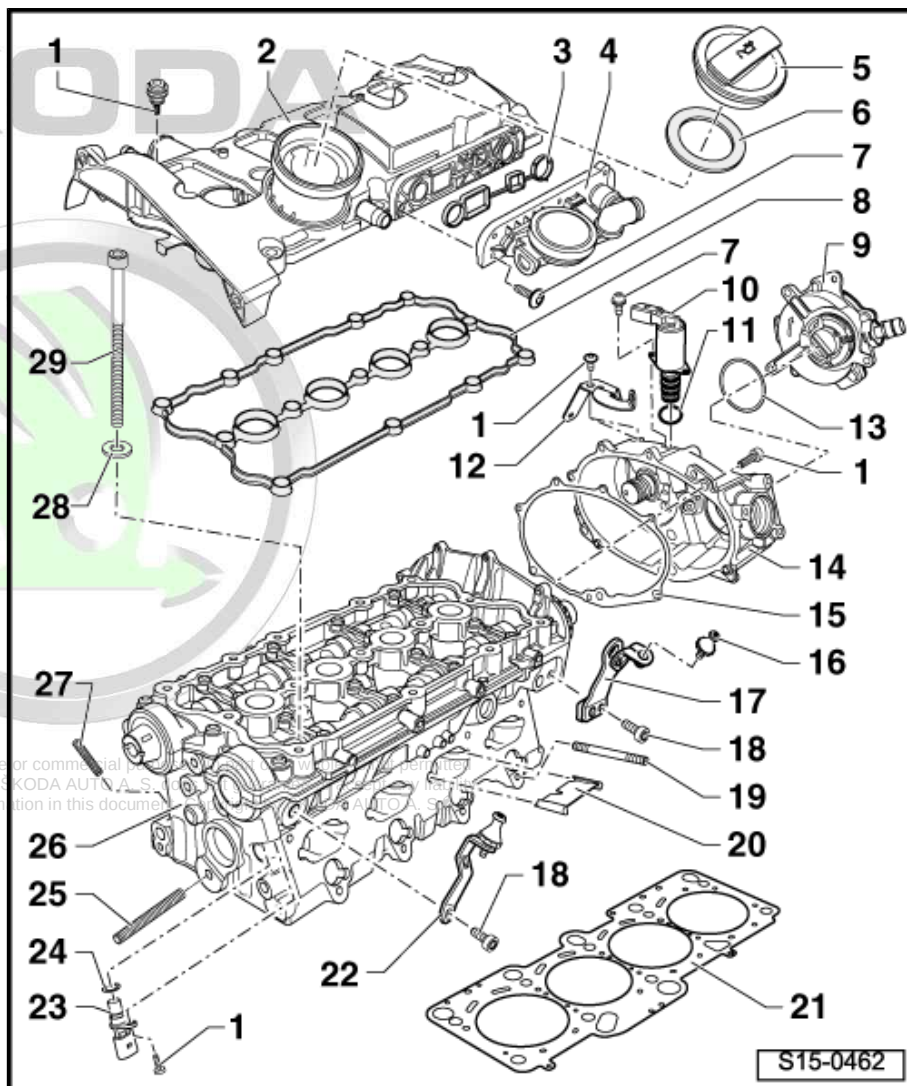
20 - Divider plate

21 - Cylinder head gasket

- ☐ replace
- ☐ Replace cylinder head gasket ⇒ [page 92](#)
- ☐ check fitting position: the part number faces the cylinder head

22 - Lifting eye - on the right

- ☐ for engine cover



**23 - Hall sender - G40-****24 - Sealing ring****25 - Pin screw, 10 Nm**

- ☐ for the tensioning roller

**26 - Cylinder head**

- ☐ removing and installing ➔ [page 82](#)
- ☐ Checking cylinder head for distortion ➔ [page 78](#)

**27 - Pin screw, 20 Nm**

- ☐ for exhaust manifold
- ☐ coat with hot bolt paste - G 052 112 A3-

**28 - Base****29 - Cylinder head bolt**

- ☐ replace
- ☐ pay attention to sequence for loosening and tightening ➔ [page 92](#)
- ☐ Tightening torque: ➔ [page 97](#)

# ŠKODA



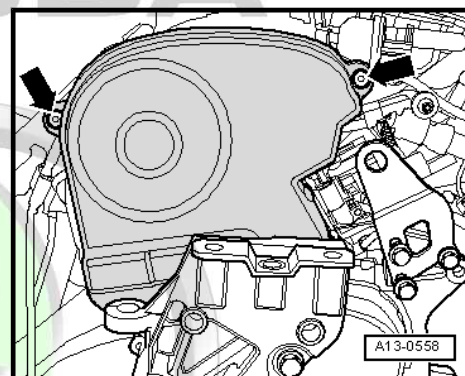
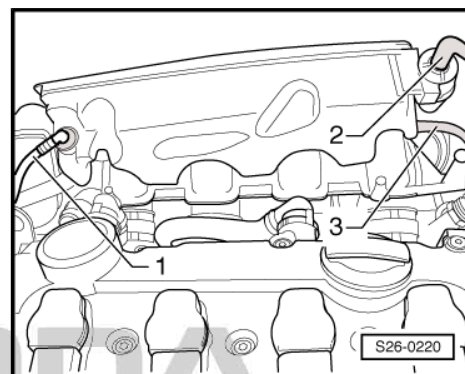
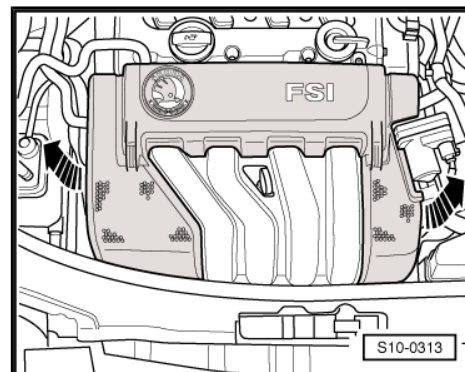
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## 2 Cylinder head, vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

### 2.1 Removing and installing cylinder head cover

#### Removing

- Pull off engine cover upwards at the sides -arrows-.
- Pull vacuum reservoir off intake manifold.
- Disconnect the vacuum line -1- from the vacuum reservoir and place the vacuum reservoir to one side.
- Remove bolts -arrows-.





- Remove ignition coils with power output stages -2-  
⇒ [page 293](#) .
- Detach the crankcase ventilation hoses -1- from the cylinder head cover.
- Unscrew the securing bolts of the cylinder head cover from outside to inside.
- Remove cylinder head cover.

### Install

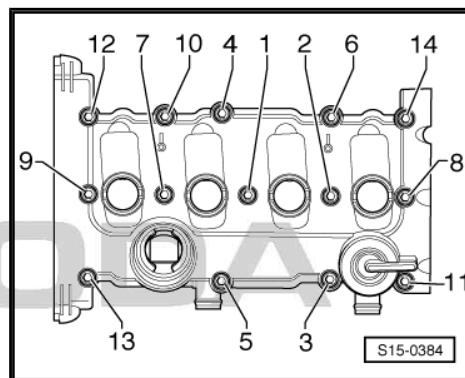
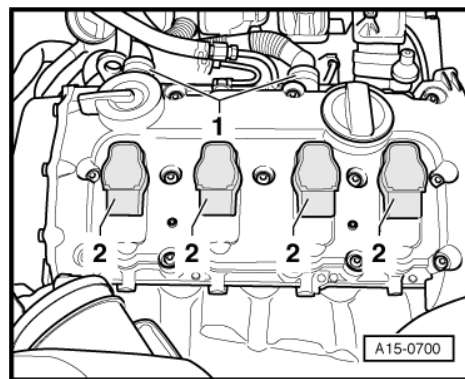
Installation is carried out in the reverse sequence. Pay attention to the following:



### Note

*Replace the gasket for the cylinder head cover when damaged.*

- Tighten the securing bolts of the cylinder head cover in several stages from inside to outside to 10 Nm.
- ♦ Tightening sequence for cylinder head cover:
- Ensure that the top toothed belt guard is fitted correctly.



## 2.2 Removing and installing the cylinder head

### Special tools and workshop equipment required

- ♦ Pliers for spring strap clamps
- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Locking pin - T10060 A-
- ♦ Offset screwdriver - T10070-
- ♦ Extractor - T40039-
- ♦ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.

### 2.2.1 Removing



### Caution

***The engine must be no more than warm to the touch when loosening the cylinder head bolts, otherwise the cylinder head can lose shape.***

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## Note

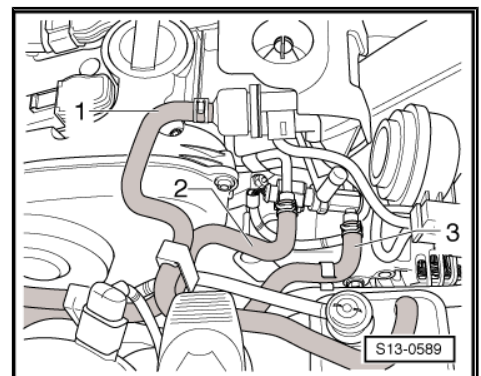
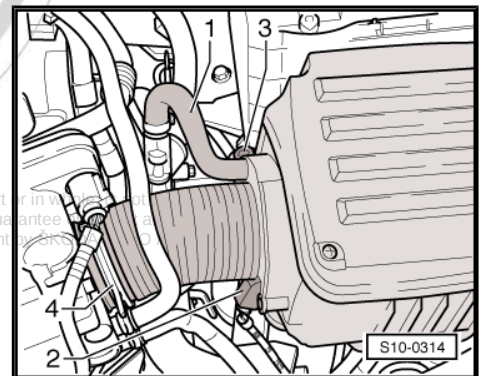
- ◆ All cable straps which are detached or cut open when removing, should be fitted on again in the same place when installing.
- ◆ If the engine oil is contaminated, replace the engine oil ⇒ Maintenance ; Booklet Octavia II .
- Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ [page 4](#) .



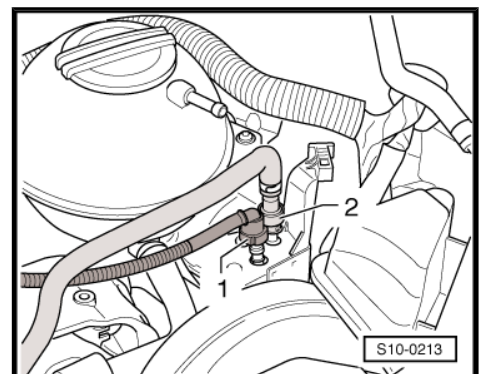
## WARNING

Relieve pressure in the high pressure system ⇒ [page 5](#) .

- Disconnect the battery-earth strap with the ignition off and electrical consumers switched off ⇒ Electrical System; Rep. gr. 27 .
- Remove cylinder head cover ⇒ [page 81](#) .
- Disconnect hose -1- and plug -2- from air filter housing.
- Unscrew bolt -3-.
- Disconnect air guide hose -4- from the throttle valve control unit. To do so, open the spring-type clip with spring-type clip pliers .
- Remove air filter.
- Drain coolant ⇒ [page 149](#) .
- Mark the fuel feed line and fuel return-flow line.
- Detach the hose -1- for the activated charcoal filter.
- Detach the fuel feed line -2- and the fuel return-flow line -3-.

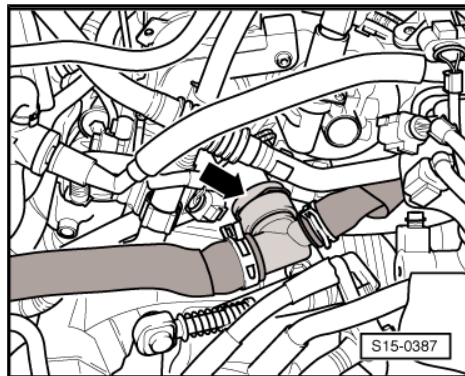


- Disconnect fuel feed line -2- (press in the circlip).

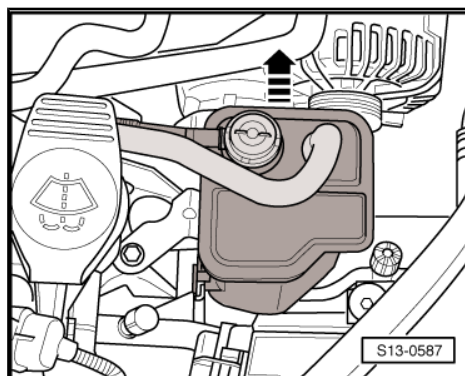




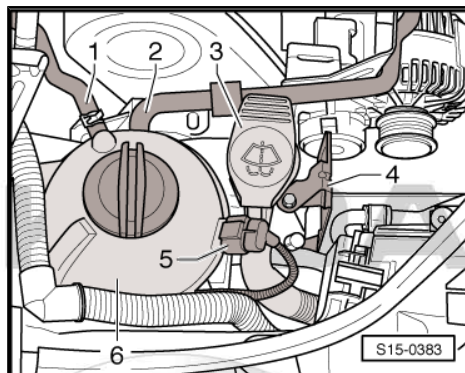
- Detach the coolant connector -arrow- at the coolant flange of the cylinder head.



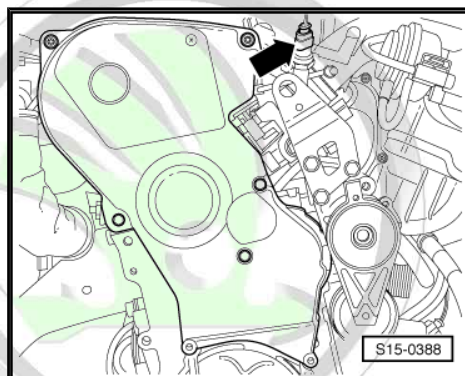
- Pull activated charcoal filter with attached lines upwards out of the mounting bracket -arrow-.



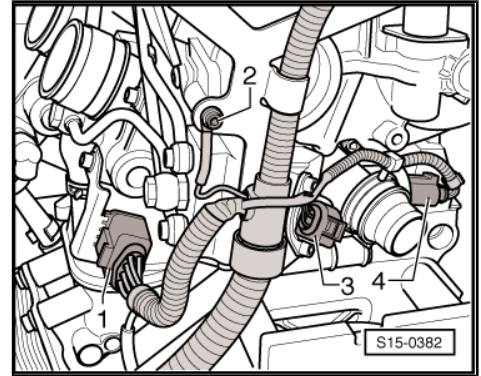
- Unscrew bracket -4- for activated charcoal filter.
- Unscrew bolts on filler neck for windshield washer fluid reservoir -3-.
- Disconnect plug connection -5-.
- Detach the coolant hoses -1- and -2- at the expansion reservoir -6-.
- Unclip coolant hose -2- from the mounting.
- Detach coolant expansion reservoir -6-.



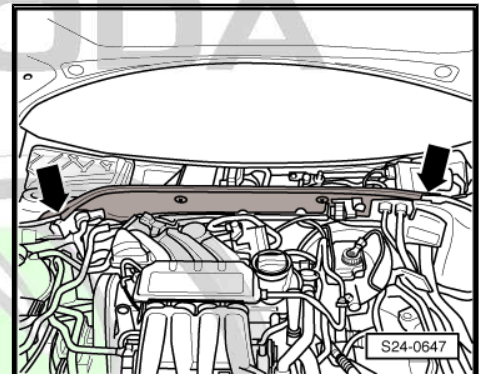
- Disconnect the plug -arrow- from the Hall sender - G40- .
- Removing the intake manifold ⇒ [page 243](#) .
- Removing the toothed belt:
- ◆ Engines without split toothed belt guard ⇒ [page 40](#) .
- ◆ Engines with split toothed belt guard ⇒ [page 50](#) .



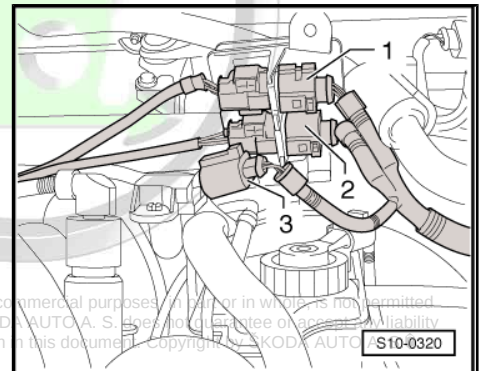
- Unscrew earth wire -2-.
- Disconnect plug connections -1-, -3- and -4-.
- Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .



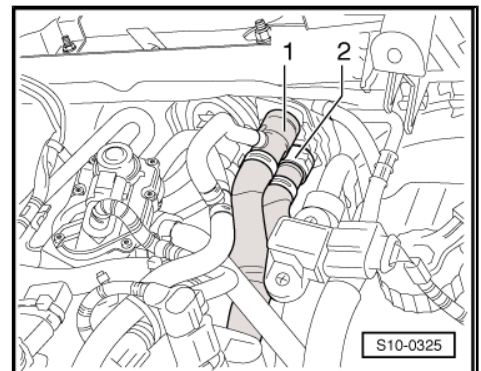
- Remove bulkhead plenum chamber -arrows-.



- Take plug connection -1- for lambda probe 2 upstream of catalytic converter - G108- out of the holder and disconnect.
- Take plug connection -2- for lambda probe upstream of catalytic converter - G39- out of the holder and disconnect.



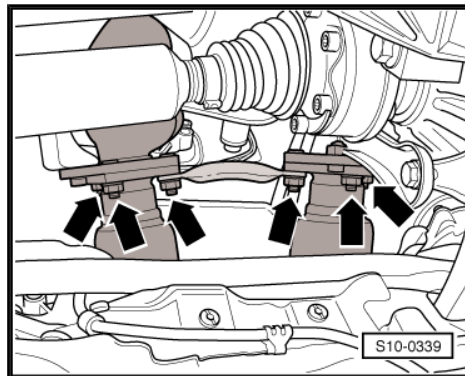
- Detach coolant hoses -1- and -2- from the heat exchanger for bulkhead heater.
- Pull coolant hoses off the throttle valve housing and exhaust gas recirculation valve.
- Remove/disconnect all other necessary electrical cables from the cylinder head and move clear.



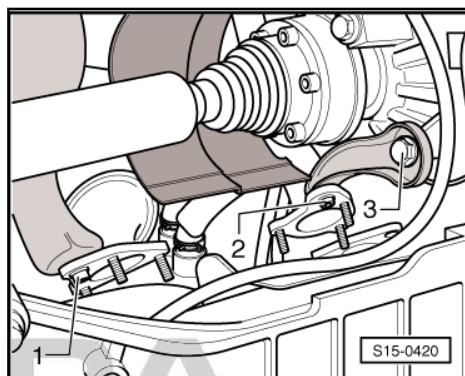
#### Vehicles with front-wheel drive



- Unscrew the securing nuts -arrows- of the front section of the exhaust system/exhaust manifold.

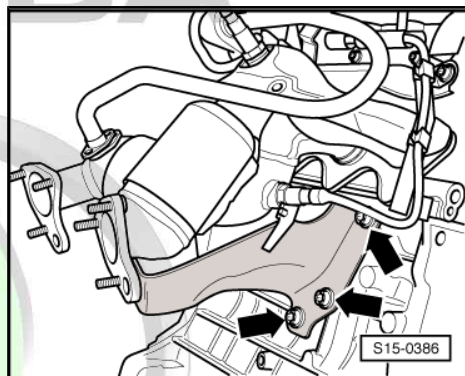


- Unscrew bolts -2- and -3- and remove left strut for exhaust manifold.
- Unscrew bolt -1- of the right strut for exhaust manifold.

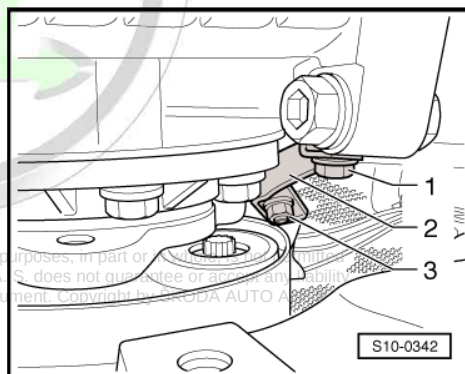


- Unscrew bolts -arrows- and remove right strut for exhaust manifold.

#### Vehicles with four-wheel drive



- Unscrew screw -1- on gearbox.
- Unscrew the securing nuts -3- (total of 6) of the front section of the exhaust system/exhaust manifold.
- Remove left strut -2- for exhaust manifold.
- Remove the front part of the front right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

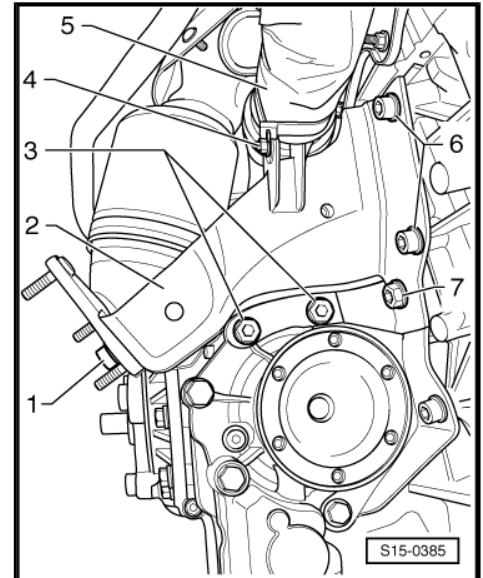


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- Unscrew nut -4- and slide the cable guide for the lambda probe wiring harness -5- upwards.
- Unscrew bolt -1-, bolts -3-, bolts -6- and bolt -7-.
- Remove right strut -2- for exhaust manifold.

Continued for all vehicles



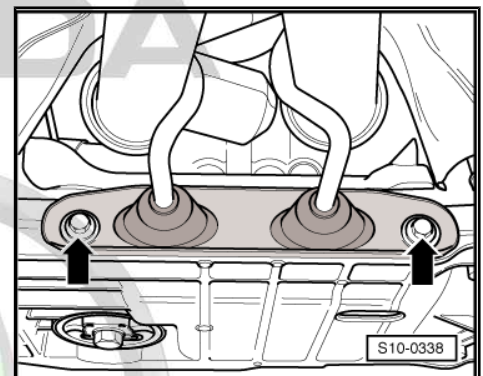
- Unbolt mounting for exhaust system -arrows-.



**Note**

*The decoupling elements in the front section of the exhaust system should not be bent by more than 10° - risk of damage.*

- Unscrew the bolts for the cylinder head cover from outside to inside.
- Remove cylinder head cover.



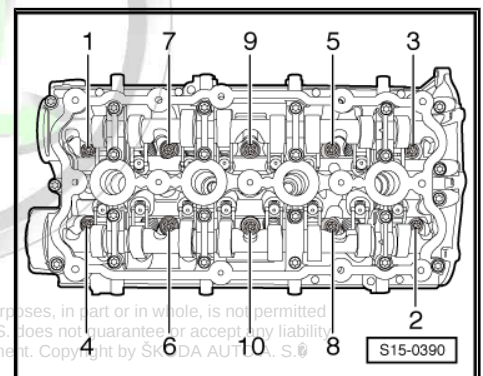
- Unscrew the cylinder head bolts in the order shown.



**Note**

*Check whether all hose- and wiring connections to the engine, gearbox, and the bodyshell.*

- Remove cylinder head.



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## 2.2.2 Install



### Note

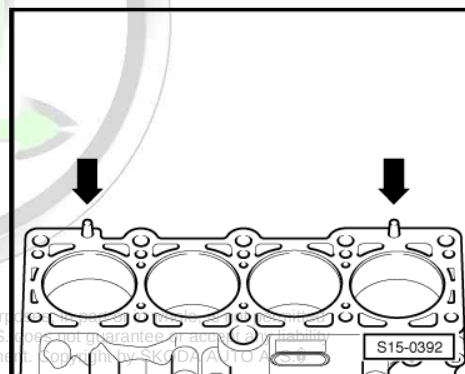
- ◆ *Replace cylinder head bolts.*
  - ◆ *When performing installation work replace the self-locking nuts.*
  - ◆ *Replace screws which have been tightened to a torquing angle as well as gasket rings and seals.*
  - ◆ *If an exchange cylinder head is installed, all the contact surfaces between the supporting elements, roller rocker fingers and the cam tracks must be oiled before the assembly of the cylinder head cover.*
  - ◆ *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
  - ◆ *Treat the new cylinder head seal with the utmost care. Damage to the silicone layer and in the area of the seal results in leakages.*
  - ◆ *There must not be any oil or coolant present in the threaded holes for the cylinder head bolts.*
- Make sure that when cleaning the cylinder head and cylinder block no foreign bodies can get into the cylinder or into the oil and coolant galleries.



### WARNING

***Wear protective gloves when working with sealant and grease remover.***

- When conducting repairs sealant residues should be removed from the contact surface of the cylinder head/cylinder block using a chemical cleaner.
- If the crankshaft has been turned in the meantime: Position piston of cylinder 1 to top dead centre and slightly turn the crankshaft anticlockwise again.
- Position the new cylinder heads. The legend (part number) must be legible on the inlet end.
- Pay attention to centring pins in cylinder block -arrows-.
- Insert the cylinder head.
- Insert cylinder head bolts and tighten hand-tight.



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- Tighten cylinder head bolts in the tightening order shown as follows:

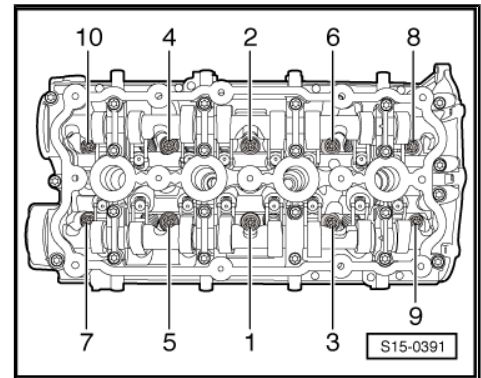
| Stage | Tighten                                                 |
|-------|---------------------------------------------------------|
| 1     | – Tighten with the torque wrench to 40 Nm.              |
| 2     | – Using a rigid wrench torque a further 90° (1/4 turn). |
| 3     | – Using a rigid wrench torque a further 90° (1/4 turn). |

The further installation is carried out in reverse order to removal. Pay attention to the following:

- Follow the tightening sequence for the cylinder head cover  
⇒ [page 81](#) .

Tightening torques ⇒ [page 76](#) .

- Fill with new coolant ⇒ [page 149](#) .
- Carry out cohesive work when reconnecting the battery ⇒  
Electrical System; Rep. gr. 27 .



## 2.3 Testing the compression

### Special tools and workshop equipment required

- ◆ Spark plug wrench , e.g. -3122 B-

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- ◆ Adapter , e.g. -V.A.G 1381/5A-

- ◆ Compression tester , e.g. -V.A.G 1763-

### Test conditions

- Engine oil temperature must be at least 30°C.
- Voltage supply o.k.

### Test sequence

- Remove the ignition coils with power output stages and the spark plugs ⇒ [page 293](#) .
- Open lid of fuse carrier in the engine compartment and unplug the fuse for Motronic current supply relay - J271- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



#### Note

*Removing fuse interrupts the voltage supply of the injection valves and ignition coils.*

- Check the compression pressure with the compression gauge inspection device - V.A.G 1763- and the adapter - V.A.G 1381/5A- .



#### Note

*Use of tester ⇒ Operating Instructions .*

- Arrange for the starter to be actuated by a second mechanic.
- Operate starter until the tester no longer indicates a pressure rise.


**Compression readings:**

| Engine identification characters | New                                | Wear limit           | Maximum difference between cylinders |
|----------------------------------|------------------------------------|----------------------|--------------------------------------|
| BLR, BLX, BVX, BVY               | 1.3...1.6 MPa<br>(13.0...16.0 bar) | 0.8 MPa<br>(8.0 bar) | 0.3 MPa<br>(3.0 bar)                 |
| BLY, BVZ, BWA                    | 1.1...1.4 MPa<br>(11.0...14.0 bar) | 0.7 MPa<br>(7.0 bar) | 0.3 MPa<br>(3.0 bar)                 |

If the specified values are not reached, test the combustion chamber for tightness ➔ [page 90](#) .

Installation occurs in reverse order to removal. Pay attention to the following:

- Install ignition coils ➔ [page 293](#) .
- Delete the contents of the event memory for the engine control unit at the end of the work as error messages were stored due to disconnecting the plugs ➔ Vehicle diagnostic tester.


**Note**

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*After deleting the event memory of the engine control unit the readiness code must be re-generated.*

## 2.4 Testing the combustion chamber for tightness

**Special tools and workshop equipment required**

- ◆ Pressure hose - MP1-210 (VW 653/3)- (replace gasket ring with a spark plug gasket ring)
- ◆ Spark plug wrench

**Test sequence**

- Unscrew the spark plugs.
- Position piston of the relevant cylinder to dead centre.
- Screw the pressure hose in the spark plug thread.
- Connect pressure hose to compressed air.
- With the assistance of a second mechanic, lock the screw at the crankshaft on TDC position in order to avoid the displacement of the piston after pressure build-up.
- Build up a pressure of approx. 0.3 MPa (3 bar) in the combustion chamber.
- Determine how the pressure escapes:
  - 1 - Via the inlet valve(s) - the pressure enters the throttle valve.
  - 2 - Via the outlet valve(s) - the pressure enters the exhaust system.
  - 3 - Via the piston rings - the pressure enters the cylinder block.

### 3 Cylinder head, engine identification characters BWA

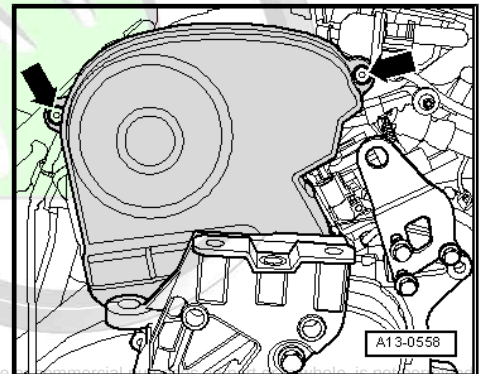
#### 3.1 Removing and installing cylinder head cover

##### Special tools and workshop equipment required

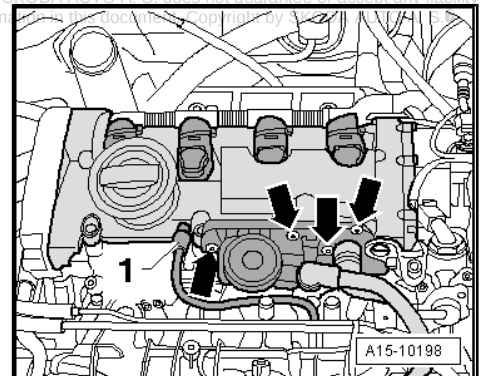
- ◆ Pliers for spring strap clamps

##### Removing

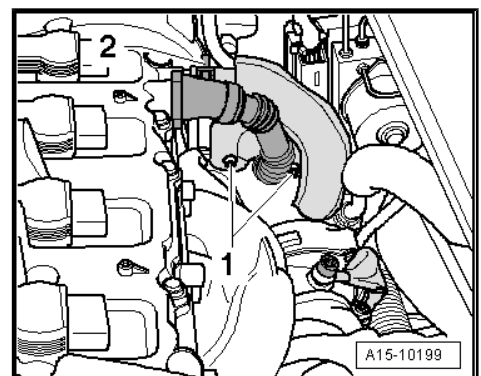
- Remove engine cover ⇒ [page 242](#) .
- Remove bolts -arrows-.
- Remove ignition coils with power output stage ⇒ [page 293](#) .



- Detach the line -1- from the cylinder head cover.
- Remove the valve body from the cylinder head cover -arrows-.



- Detach the crankcase ventilation line with heat shield from the exhaust gas turbocharger -1-.
- Open the spring-type clip -2- and detach hose to exhaust gas turbocharger from cylinder head cover.
- Unscrew the securing bolts of the cylinder head cover from outside to inside.
- Remove cylinder head cover.



##### Install

Installation is carried out in the reverse sequence. Pay attention to the following:



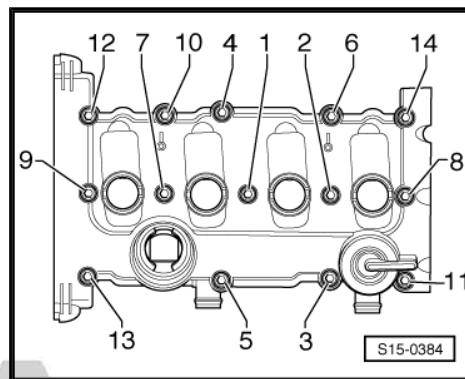
##### Note

*Replace the gasket for the cylinder head cover when damaged.*

- Tighten the securing bolts of the cylinder head cover in several stages from inside to outside to 10 Nm.



- ◆ Tightening sequence for cylinder head cover:
- Ensure that the top toothed belt guard is fitted correctly.



## 3.2 Removing and installing the cylinder head

### Special tools and workshop equipment required

- ◆ Lifting device - MP 9-201 (2024 A)-
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Pliers for spring strap clamps
- ◆ Workshop crane , e.g. VAS 6100
- ◆ Offset screwdriver - T10070-
- ◆ Support - T10014-
- ◆ Extractor - T40039-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.

### 3.2.1 Removing



#### Caution

*The engine must be no more than warm to the touch when loosening the cylinder head bolts, otherwise the cylinder head can lose shape.*



#### Note

- ◆ All cable straps which are detached or cut open when removing, should be fitted on again in the same place when installing.
- ◆ If the engine oil is contaminated, replace the engine oil ⇒ Maintenance ; Booklet Octavia II .
- Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ [page 4](#) .



#### WARNING

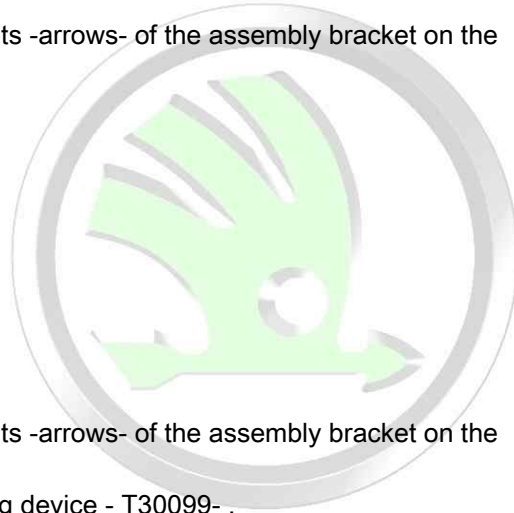
*Relieve pressure in the high pressure system ⇒ [page 5](#) .*

- Switch off ignition and all electrical loads, and pull out ignition key.
- Removing the toothed belt:



- Note**

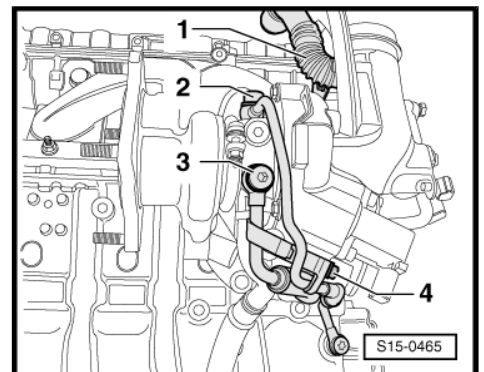
- Tighten the old bolts -arrows- of the assembly bracket on the engine to 60 Nm.



- 

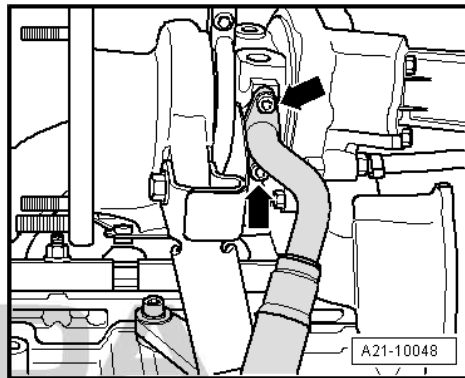
- 

- 
- A21-10030

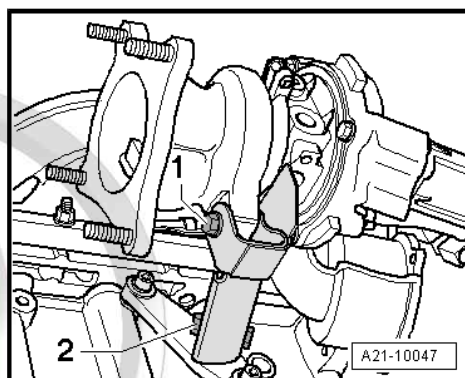




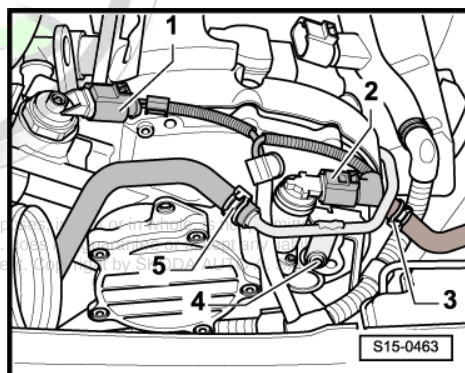
- Detach the oil return line -arrows- from the exhaust gas turbocharger.



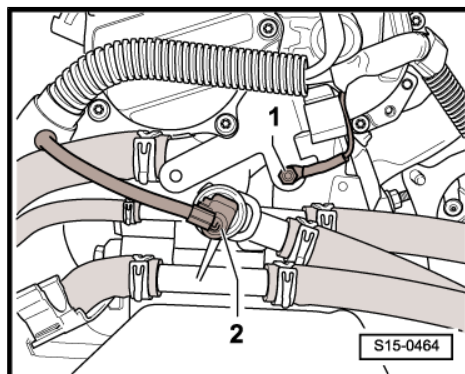
- Release screws -1- and -2- and remove the support for turbocharger.



- Disconnect plug connections -1- and -2-.
- Open the spring-type clips -3- and -5- and disconnect the coolant hoses.
- Unscrew bolt -4-.
- Remove the coolant pipe with the heat shield ⇒ [page 144](#).

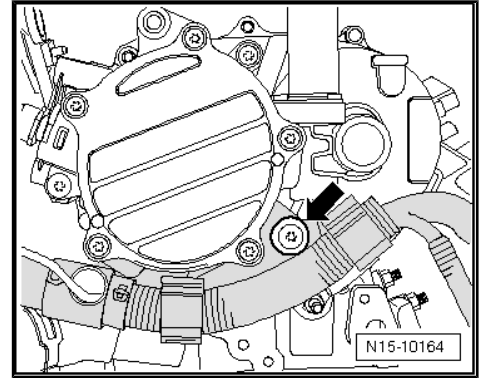


- Unscrew earth wire -1-.
- Disconnect plug connection -2-.



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- Unbolt the cable holder -arrow- and place the wiring harness to one side.



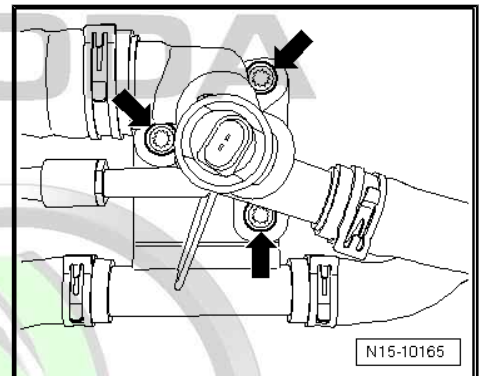
- Unbolt the coolant flange with connected coolant hoses -arrows-.

#### Vehicles with auxiliary heating.

- Unscrew the bolts for the coolant lines of the auxiliary heating on the cylinder block and cylinder head.

#### Continued for all vehicles

- Pull the locking pin - T10060 A- out of the V-ribbed belt tensioning device.
- Remove cylinder head cover ⇒ [page 91](#) .

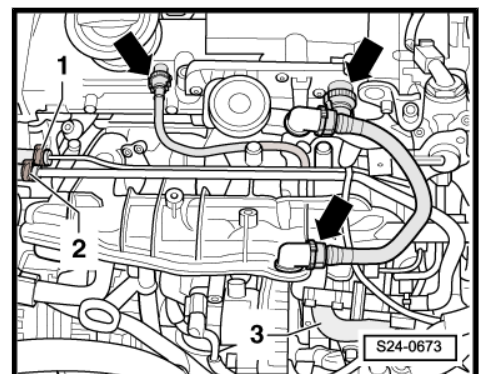
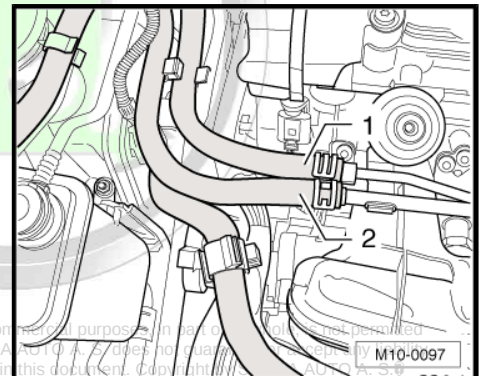


- Mark hoses -1- and -2- and disconnect from the lines.

For the rest of the work procedure, a number of plug connections must be disconnected. For the installation positions of the plug connections ⇒ [page 223](#) .

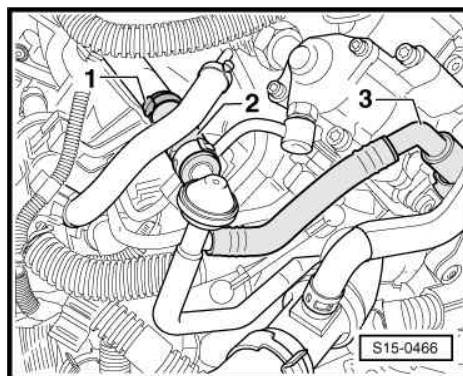
Disconnect the following plug connections:

- ◆ on the fuel pressure regulating valve - N276- of the high-pressure pump
- ◆ on the activated charcoal filter solenoid valve 1 - N80-
- ◆ on the intake manifold flap motor - V157-
- ◆ on the intake air temperature sensor - G42-
- ◆ on the throttle valve control unit - J338-
- ◆ Disconnect and unhook the plug connection for the injection valves
- ◆ Disconnect and unhook the plug connection for the Hall sender - G40- and fuel pressure sender - G247-
- ◆ Unclip the wiring harness for ignition coils/exhaust gas turbo-charger and place to the side.
- Remove pipe -3- from the oil filter holder and take out upwards.





- Open the clamp -1- and detach the hose -2- from the intake manifold.
- Detach the vacuum line -3- from the vacuum pump.
- Remove throttle flap control unit - J338- ➔ [page 257](#) .

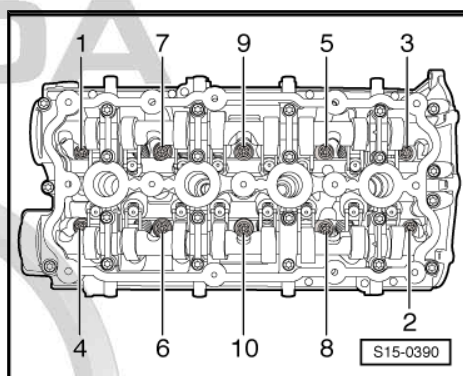


- Loosen all cylinder head bolts in the order shown. Unscrew the cylinder head bolt except for 2 pieces.



**Note**

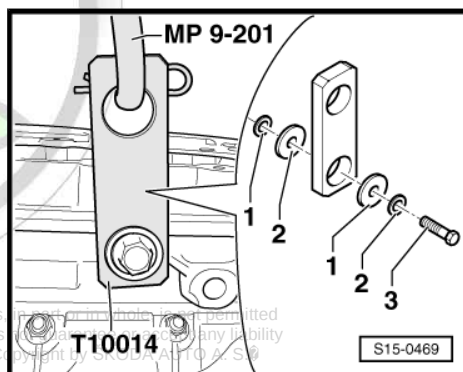
- ◆ *These 2 screws must remain screwed in to secure the cylinder head.*
- ◆ *Once all bolts have been unscrewed, the cylinder head tilts down to the bulkhead.*



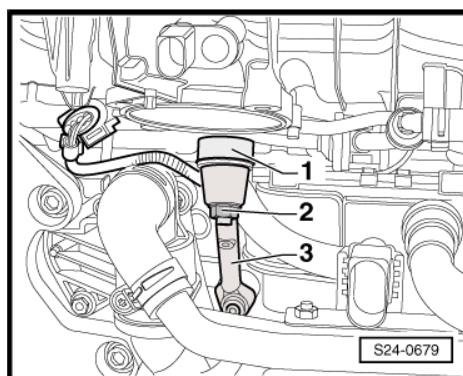
- Attach holder - T10014- each with 2 small and large washers, to the cylinder head as shown in the figure.

- 1 - Washer Ø 8, small
- 2 - Washer Ø 8, large The external diameter of the washer must be larger than the hole in the engine mount.
- 3 - Screw M8 x 30

- Hook lifting device - MP9-201- into the mounting bracket - T10014- and the lifting eye to the cylinder head to the front left.



- Unscrew nut -2- from rubber-metal bearing -1-.



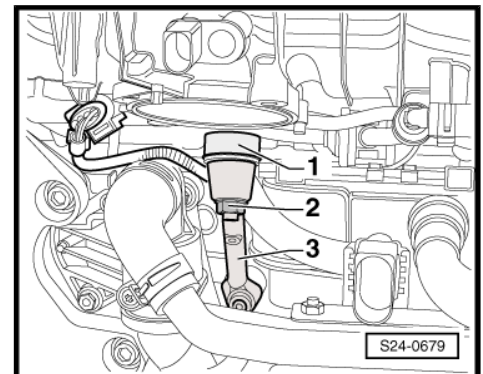
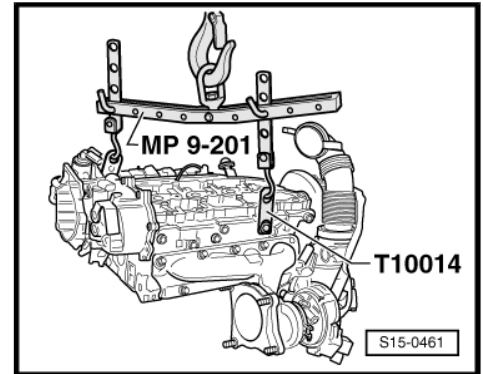


- Hook the lifting device - MP 9-201- into the workshop crane and raise the cylinder head very lightly.

**i** Note

*Check whether all hose- and wiring connections to the engine, gearbox, and the bodyshell.*

- Remove the last two cylinder head bolts.
- Raise the cylinder head off the cylinder block with the workshop crane. At the same time, guide the rubber-metal bearing -1- out of the intake manifold support -3-.



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### 3.2.2 Install

**i** Note

- ◆ *Replace cylinder head bolts.*
- ◆ *When performing installation work replace the self-locking nuts.*
- ◆ *Replace screws which have been tightened to a torquing angle as well as gasket rings and seals.*
- ◆ *If an exchange cylinder head is installed, all the contact surfaces between the supporting elements, roller rocker fingers and the cam tracks must be oiled before the assembly of the cylinder head cover.*
- ◆ *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
- ◆ *Treat the new cylinder head seal with the utmost care. Damage to the silicone layer and in the area of the seal results in leakages.*
- ◆ *There must not be any oil or coolant present in the threaded holes for the cylinder head bolts.*
- Make sure that when cleaning the cylinder head and cylinder block no foreign bodies can get into the cylinder or into the oil and coolant galleries.



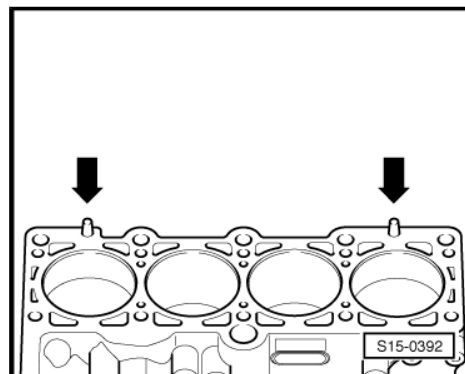
**WARNING**

***Wear protective gloves when working with sealant and grease remover.***

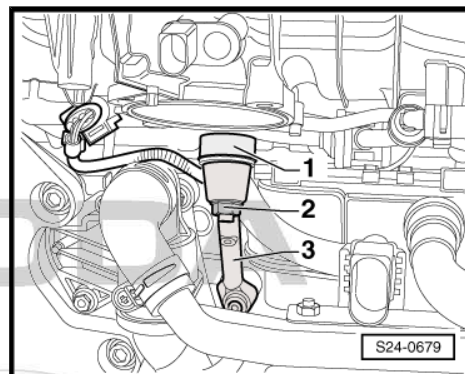




- When conducting repairs sealant residues should be removed from the contact surface of the cylinder head/cylinder block using a chemical cleaner.
- If the crankshaft has been turned in the meantime: Position piston of cylinder 1 to top dead centre and slightly turn the crankshaft anticlockwise again.
- Position the new cylinder heads. The legend (part number) must be legible on the inlet end.
- Pay attention to centring pins in cylinder block -arrows-.



- Place the cylinder head onto the cylinder block with the workshop crane. At the same time, guide the rubber-metal bearing -1- into the intake manifold support -3-.
- Insert cylinder head bolts and tighten hand-tight.



- Tighten cylinder head bolts in the tightening order shown as follows:

| Stage | Tighten                                                 |
|-------|---------------------------------------------------------|
| 1     | – Tighten with the torque wrench to 40 Nm.              |
| 2     | – Using a rigid wrench torque a further 90° (1/4 turn). |
| 3     | – Using a rigid wrench torque a further 90° (1/4 turn). |

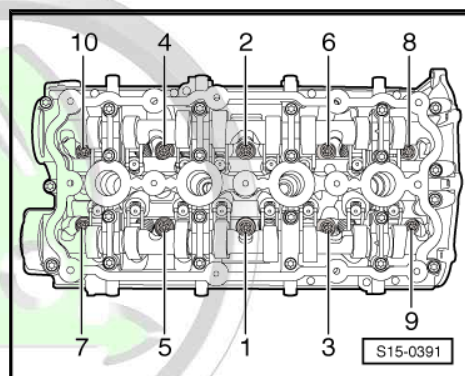
The further installation is carried out in reverse order to removal. Pay attention to the following:

- Follow the tightening sequence for the cylinder head cover ➔ [page 91](#).

Tightening torques ➔ [page 79](#).

- Fill with new coolant ➔ [page 149](#).

- Carry out cohesive work when reconnecting the battery ➔ Electrical System; Rep. gr. 27.



### 3.3 Testing the compression

- Remove engine cover ➔ [page 242](#).
- Testing compression pressure ➔ [page 89](#).



### 3.4 Testing the combustion chamber for tightness

Work procedure ➤ [page 90](#) .

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## 4 Valve gear - part 1

### 4.1 Summary of components



#### Note

- ◆ *Cylinder heads with cracks between the valve seats or between a valve seat ring and the spark plug thread may continue to be used without any reduction in life provided these are slight initial cracks which are not more than 0.3 mm wide, or cracks exist only at the first 4 turns of the spark plug thread.*
- ◆ *Cylinder head and ladder frame may only be replaced together.*
- ◆ *After installing the camshafts, the engine must not be started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise valves would strike the pistons).*
- ◆ *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*
- ◆ *Always replace seals and gasket rings.*

1 - 50 Nm + torque a further 180° (1/2 turn)

- ☐ replace
- ☐ to release and tighten use counterholder - MP 1-216 (3036)-

2 - Camshaft pulley

- ☐ Installation position fixed by woodruff key

3 - Sealing ring for exhaust camshaft

- ☐ replace ⇒ [page 107](#)

4 - Cylinder head

- ☐ Do not rework valve seats; only grinding in with grinding paste is permissible

5 - Valve guide

- ☐ check ⇒ [page 102](#)

6 - Valve stem seal

- ☐ replace ⇒ [page 102](#)

7 - Valve spring

8 - Valve spring retainer above

9 - Cotteners

10 - Hydraulic supporting element

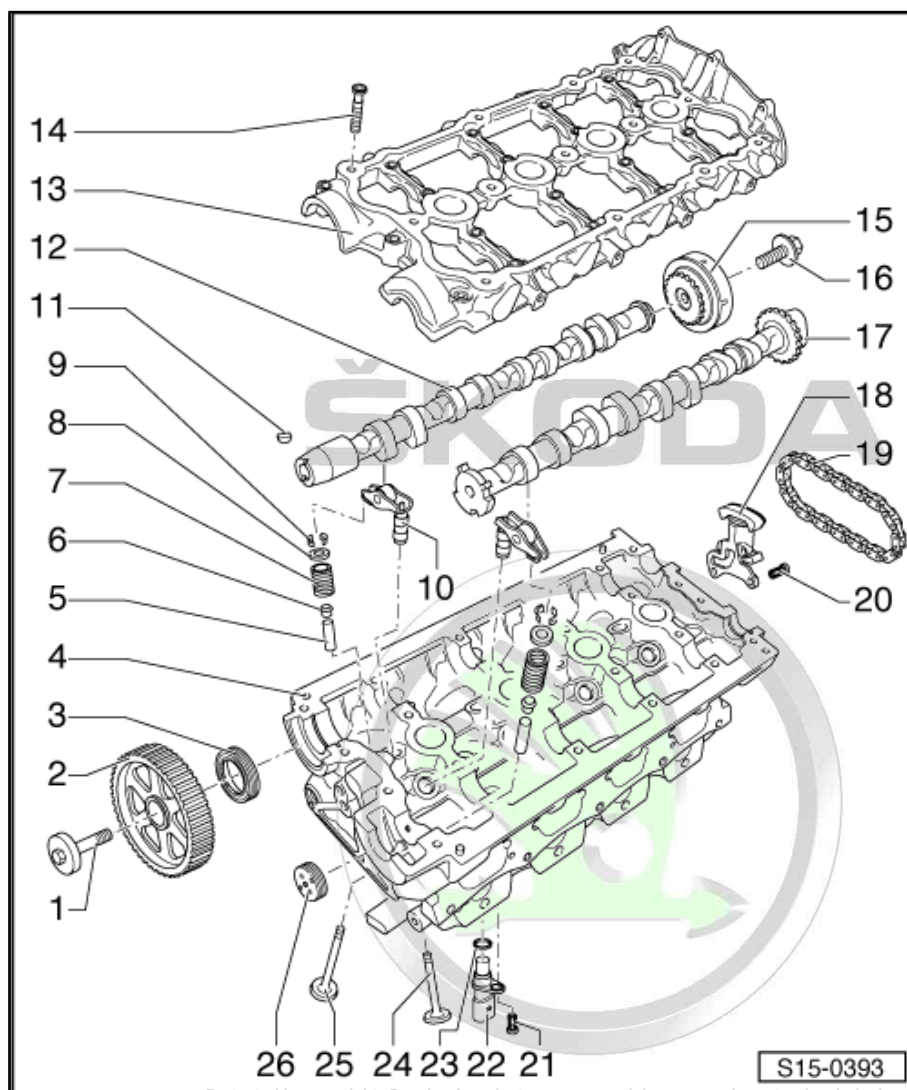
- ☐ do not interchange
- ☐ Oil contact surface.

11 - Woodruff key

- ☐ check tightness

12 - Exhaust camshaft

- ☐ Slack: max. 0.035 mm



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- ☐ removing and installing ⇒ [page 113](#)

### 13 - Ladder frame

- ☐ with integrated camshaft bearings
- ☐ Clean the sealing surfaces; do not rework
- ☐ remove old sealant residues

### 14 - 8 Nm + torque a further 90° (1/4 turn)

- ☐ replace

### 15 - Camshaft adjuster

- ☐ removing and installing ⇒ [page 109](#)

### 16 - 20 Nm + torque a further 45° (1/8 turn)

- ☐ replace
- ☐ to loosen and tighten, use the camshaft clamp - T10252- and socket insert - T40080-

### 17 - Inlet camshaft

- ☐ Slack: max. 0.035 mm
- ☐ removing and installing ⇒ [page 113](#)

### 18 - Chain tensioner

- ☐ before disassembly, secure with 2 mm Allen key

### 19 - Chain

- ☐ removing and installing ⇒ [page 109](#)
- ☐ check for wear

### 20 - 10 Nm

### 21 - 10 Nm

### 22 - Hall sender - G40-

### 23 - O-ring

- ☐ replace

### 24 - Exhaust valve

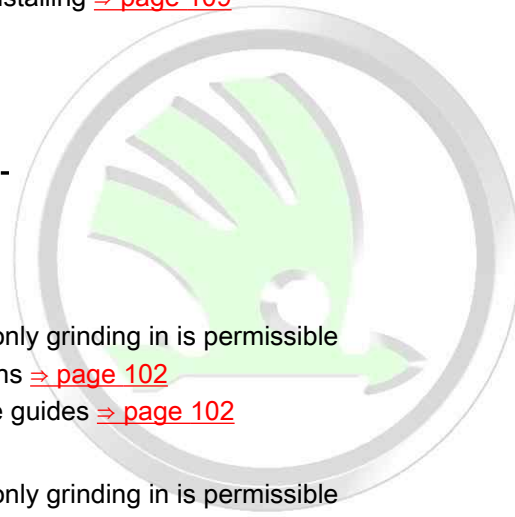
- ☐ do not rework, only grinding in is permissible
- ☐ Valve dimensions ⇒ [page 102](#)
- ☐ inspecting valve guides ⇒ [page 102](#)

### 25 - Inlet valve

- ☐ do not rework, only grinding in is permissible
- ☐ Valve dimensions ⇒ [page 102](#)
- ☐ inspecting valve guides ⇒ [page 102](#)

### 26 - Screw cap

- ☐ replace
- ☐ removing: Using a screwdriver, perforate the middle of the cover and prise out.
- ☐ Installing: Do not use sealant; press in with thrust piece - T10174- up to the stop.

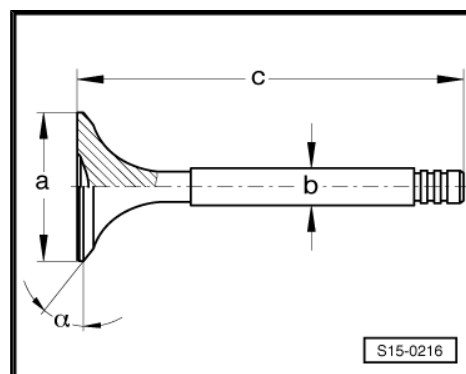


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## 4.2 Valve dimensions

Inlet and exhaust valves must not be reworked. Only grinding in with grinding paste is permissible.

| Dimension |    | Inlet valve   | Exhaust valve |
|-----------|----|---------------|---------------|
| Ø a       | mm | 33,75...33,95 | 27,90...28,10 |
| Ø b       | mm | 5,973...5,987 | 5,958...5,972 |
| c         | mm | 103,97        | 101,87        |
| α         | ∠° | 45            | 45            |



## 4.3 Inspect valve guides

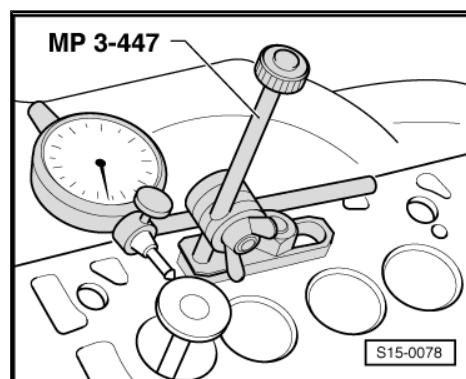
### Special tools and workshop equipment required

- ♦ Universal dial gauge holder - MP3-447 (VW 387)-
- ♦ Dial gauge
- Insert valve into guide. The end of the valve stem must be flush with the guide. On account of differing stem diameters, only use inlet valve in inlet guide and exhaust valve in exhaust guide.
- Determine valve rock.
- Wear limit: 0.8 mm



### Note

- ♦ *If the wear limit is exceeded, repeat measurement with new valves. If the wear limit is again exceeded, replace cylinder head. The valve guides cannot be changed.*
- ♦ *If the valve is replaced when carrying out repair work, use a new valve for the measurement.*



## 4.4 Replacing valve stem seals

(With cylinder head installed)

### Special tools and workshop equipment required

- ♦ Valve supporting plate - MP1-218-
- ♦ Extractor - MP1-230 (3364)-
- ♦ Valve stem seal insertion tool - MP1-233 (3365)-
- ♦ Adapter - T40012-
- ♦ Disassembly and assembly device for valve collets - VAS 5161-
- ♦ Guide plate - VAS 5161/19- , -VAS 5161/19A- or -VAS 5161/19B-
- ♦ Spark plug wrench , e.g. -3122 B-



## 4.4.1 Removing

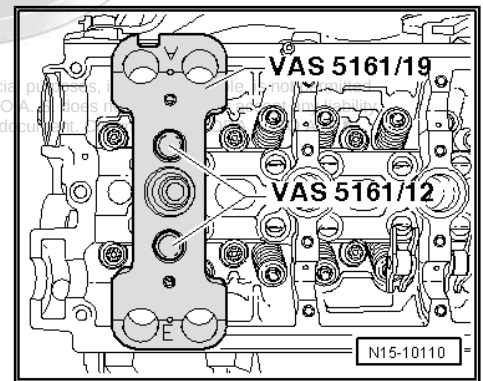
### Note

*With cylinder head removed, use valve supporting plate - MP1-218-.*

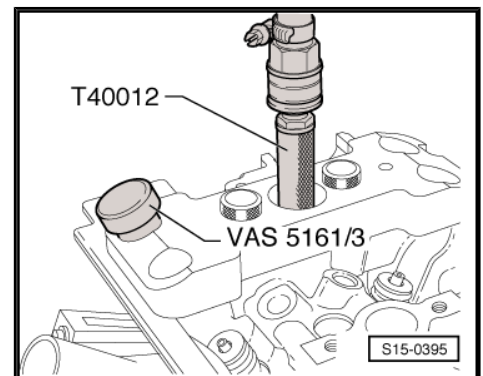
- Remove cylinder head cover:
- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ ➔ [page 81](#).
- ◆ Vehicles with engine identification characters BWA ➔ [page 91](#).
- Unscrew the spark plugs.
- Remove the camshafts ➔ [page 113](#).
- Remove roller rocker arm and place on a clean surface. When doing this, ensure that roller rocker fingers are not interchanged.

### Note

- ◆ *Only vehicles with engine identification characters BLR, BLX, BVX, BLY:*
- ◆ *To replace the valve stem seals of the exhaust valves of cylinders 3 and 4, the exhaust gas recirculation valve - N18- must also be removed ➔ [page 291](#).*
- Tighten the guide plate - VAS 5161/19- , -VAS 5161/19A- or - VAS 5161/19B- with the knurled screws - VAS 5161/12- as shown.
- Put the piston of the relevant cylinder at "bottom dead centre".

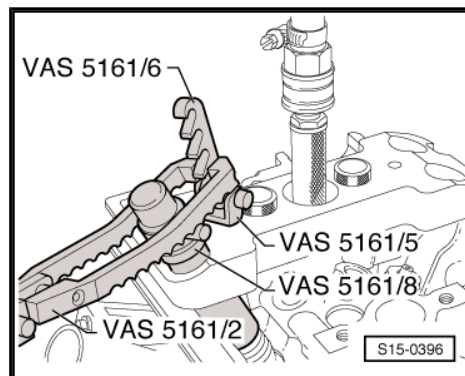


- Screw the adapter - T40012- into the spark plug thread and connect compressed air at minimum 0.6 MPa (6 bar).
- Knock tight valve collets loose with the drift - VAS 5161/3- and a plastic hammer.





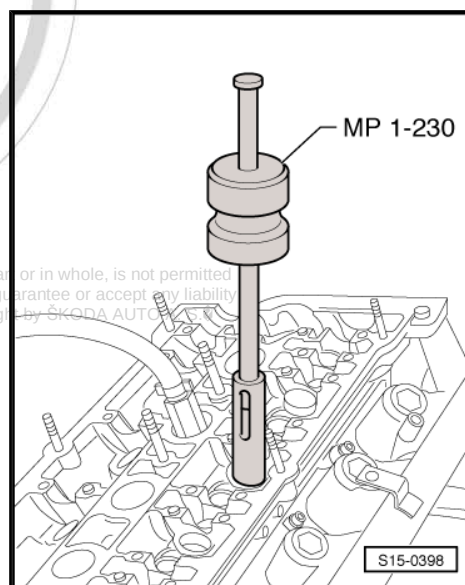
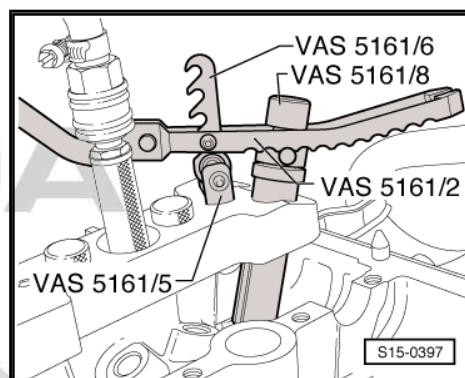
- Screw the detent part - VAS 5161/6- and the interlocking fork - VAS 5161/5- into the guide plate - VAS 5161/19- , -VAS 5161/19A- or -VAS 5161/19B- .
- Insert the assembly cartridge - VAS 5161/8- into the guide plate - VAS 5161/19- , -VAS 5161/19A- or -VAS 5161/19B- .
- Hook the pressure fork - VAS 5161/2- into the detent part - VAS 5161/6- .



### Note

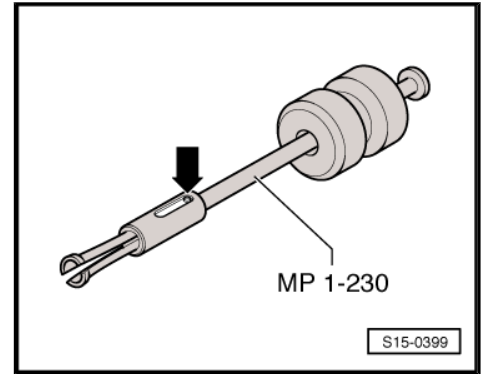
*The pressure fork - VAS 5161/2- must be hooked on the outlet side, as shown.*

- Push the assembly cartridge - VAS 5161/8- down. Turn the knurled screw of the assembly cartridge - VAS 5161/8- to the right, until the tips engage in the valve collets.
- Move the knurled screw of the assembly cartridge back and forward slightly. This pushes the valve collets apart and into the assembly cartridge.
- Release the pressure fork - VAS 5161/2- .
- Remove assembly cartridge - VAS 5161/8- .
- Detach guide plate - VAS 5161/19- , -VAS 5161/19A- or -VAS 5161/19B- .
- Pull off valve stem seals with the extractor - MP1-230- .

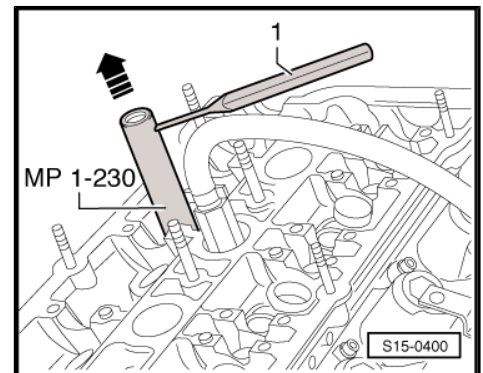


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- If the extractor - MP1-230- cannot be used due to space constraints, drive out the roll pin -arrow- with a drift and remove the impactor.

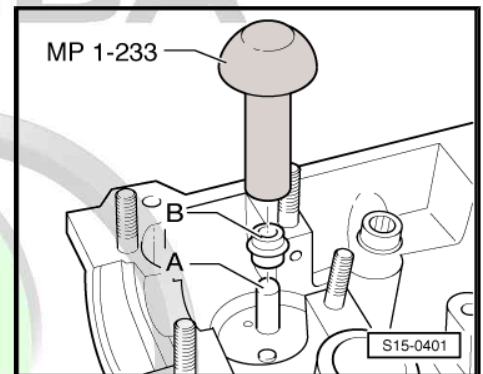


- Place the lower part of the extractor - MP1-230- on the valve stem seal.
- Insert the mandrel -1- into the bore in the lower part of the extractor.
- Attach an assembly lever to the assembly device and remove the valve stem seal -arrow-.

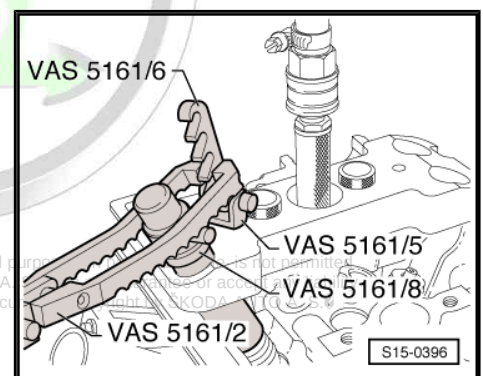


#### 4.4.2 Install

- To avoid damaging the new valve stem seals -B-, fit a plastic sleeve -A- onto the valve stem.
- Oil the sealing lip of the valve stem seal -B-, insert into the valve stem seal insertion tool - MP1-233- and carefully push onto the valve guide.
- Remove plastic sleeve -A-.
- Insert the valve spring and the valve spring retainer.
- Install the disassembly and assembly device - VAS 5161- as shown.



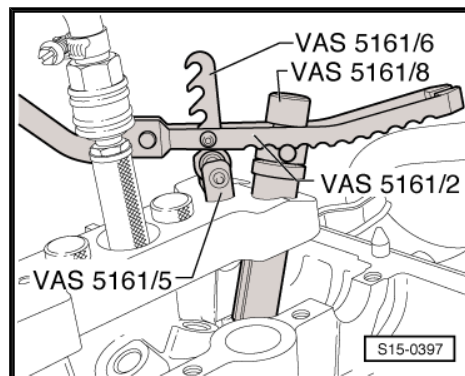
#### Inlet side



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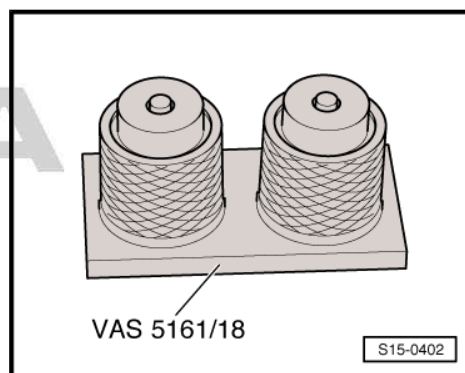


## Outlet side



### Note

- ◆ If the valve collets were removed from the assembly cartridge, they must be inserted into the insertion device - VAS 5161/18- first.
- ◆ Press the assembly cartridge - VAS 5161/8- from above onto the insertion device and pick up the valve collets.
- Press the assembly cartridge - VAS 5161/8- with pressure fork - VAS 5161/2- downwards and turn the knurled screw on the assembly cartridge one way and other while pulling upwards.
- Relieve the load on the pressure fork - VAS 5161/2- when the knurled screw of the assembly cartridge - VAS 5161/8- is removed.
- Install the disassembly and assembly device for valve collets - VAS 5161- as shown.



The further installation is carried out in reverse order to removal.

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## 5 Valve gear - part 2

### 5.1 Replacing exhaust camshaft seal

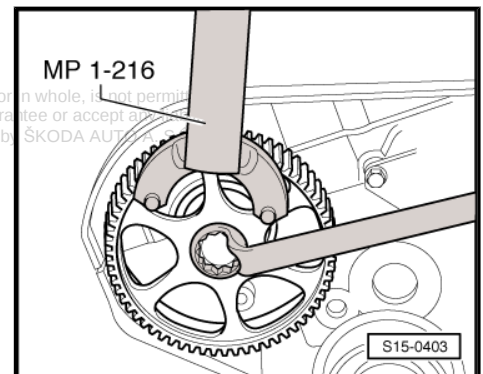
#### Special tools and workshop equipment required

- ◆ Supporting device - T30099-
- ◆ Gasket ring extractor - MP1-215 (2085)-
- ◆ Adapter - MP1-215/2 (2085/2)-
- ◆ Counterholder - MP1-216 (3036)-
- ◆ Assembly device - T10071-
- ◆ Thrust piece - T10353-
- ◆ Two-arm puller - T40001- with claw - T40001/6- and claw - T40001/7-

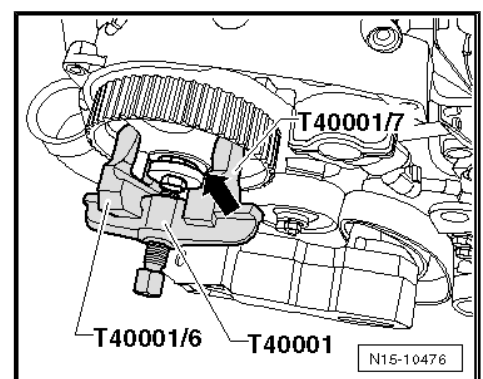
#### Removing

- Removing the toothed belt:
  - ◆ Engines without split toothed belt guard ⇒ [page 40](#) .
  - ◆ Engines with split toothed belt guard ⇒ [page 50](#) .
- Loosen bolt of camshaft sprocket. Use counterholder - MP1-216- for this purpose.

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- Unscrew bolt of camshaft sprocket approx. 10 mm -arrow-.
- Remove camshaft sprocket with puller - T40001- , claw - T40001/6- and claw - T40001/7- .
- Remove the securing bolt and bolt for the camshaft sprocket.
- Screw the adapter - 2085/2- by hand into the camshaft up to the stop to guide the sealing ring extractor.
- Turn inner part of gasket ring extractor - MP1-215- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.







- Oil the thread head of the gasket ring extractor - MP1-215 - , position and forcefully screw it into the gasket ring as far as possible.
- Release knurled screw and turn the inner side against the camshaft until the gasket ring is pulled out.
- Clamp gasket ring extractor into the vice at the flats. Remove gasket ring with pliers.

#### Install



#### Note

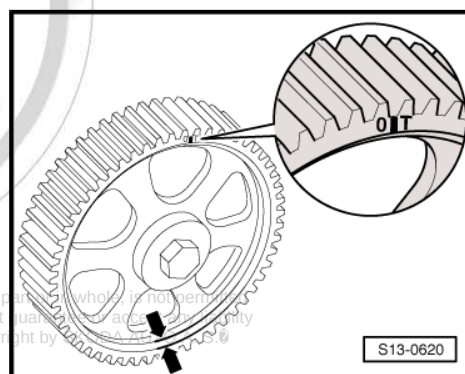
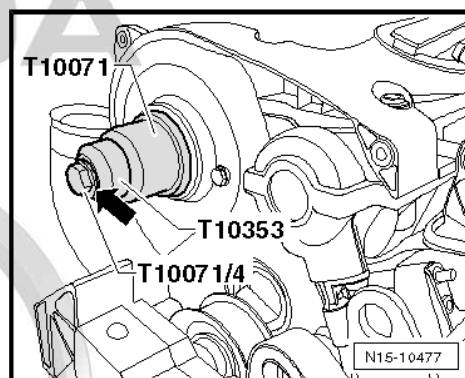
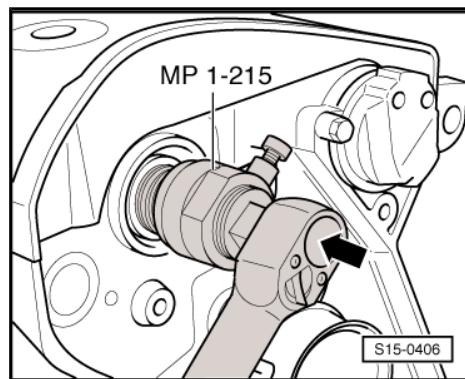
*Do not oil sealing lip of the gasket ring.*

- Remove oil residue on the camshaft stud with a clean cloth.
- Tape slot on the cone of the exhaust camshaft with adhesive tape and carefully push the dry sealing ring onto the camshaft.
- Press in the sealing ring with the assembly device - T10071- , the thrust piece - T10353- and a washer -arrow- up to the stop. Use the bolt - T10071/4- for this purpose.



#### Note

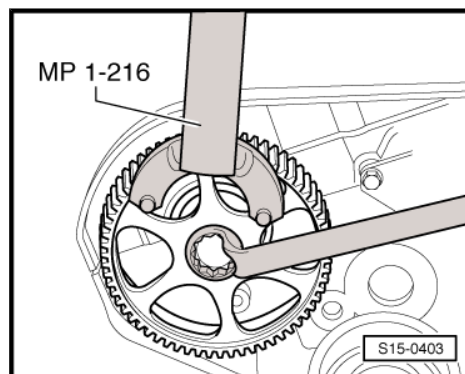
- ♦ *When turning the camshaft, the piston must not be at TDC. Risk of damaging valves and pistons.*
- ♦ *Make sure that the key is seated correctly.*
- Insert the key into the camshaft.
- ♦ Note the installation position of the camshaft sprockets: The narrow channel on the camshaft sprocket points outwards -arrows- and the TDC marking for the cylinder 1 is visible.



- Install camshaft timing gear. To tighten the new bolt, hold the camshaft sprocket with the counterholder - MP1-216- .

Tightening torque: 50 Nm + torque a further 180° (1/2 turn).

The further installation is carried out in reverse order to removal.



## 5.2 Removing and installing camshaft control

### Special tools and workshop equipment required

- ◆ Hose clamps up to 25 mm - MP7-602 (3094)- , only engine identification characters BWA
- ◆ Two-hole nut turner - T10020-
- ◆ Offset screwdriver - T40080-
- ◆ Camshaft clamp - T10252-
- ◆ 2 mm hexagon wrench

### 5.2.1 Removing



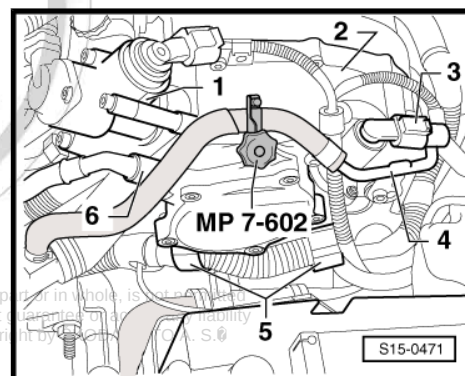
#### WARNING

*Relieve pressure in the high pressure system ➔ [page 5](#) .*

- Switch off ignition and all electrical loads, and pull out ignition key.
- Remove cylinder head cover:
- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ ➔ [page 81](#) .
- ◆ Vehicles with engine identification characters BWA ➔ [page 91](#) .
- Remove ignition coils with power output stage ➔ [page 293](#) .

#### Vehicles with engine identification characters BWA

- Remove high pressure pump -1- ➔ [page 262](#) .
- Detach the vacuum line -6- from the vacuum pump.
- Release and pull off connector -3-.
- Clamp off the coolant hose with the hose clamp - MP7-602- and detach from the coolant pipe -4-.
- Remove the coolant pipe -4- from the engine.
- Unhook the wiring harness from brackets -5-.
- Remove the cover -2- from the camshaft adjuster.



#### Vehicles with engine identification characters BLR, BLX, BVX, BVY

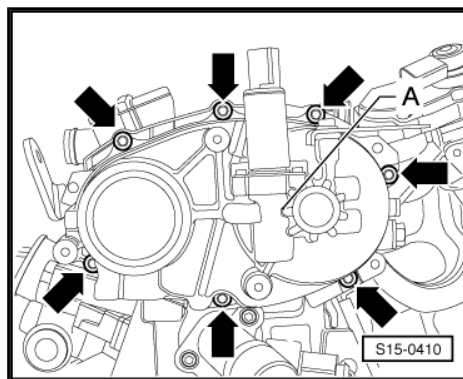
- Remove connection pipe of exhaust gas recirculation ➔ [page 291](#) .

#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

- Removing the high pressure pump ➔ [page 259](#) .

- Remove the cover -A- from the camshaft adjuster -arrows-.

Continued for all vehicles

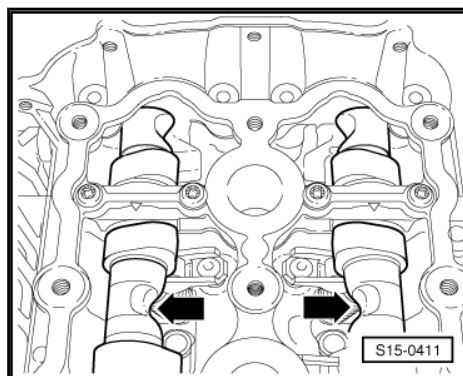


- Position camshaft sprocket at TDC marking for cylinder 1 by rotating at crankshaft:

◆ Engines without split toothed belt guard ⇒ [page 40](#) .

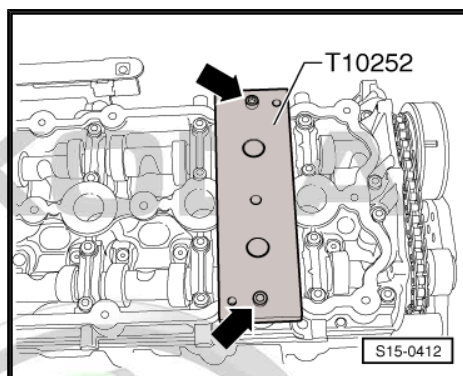
◆ Engines with split toothed belt guard ⇒ [page 50](#) .

The recesses -arrows- are now perpendicular to each other.



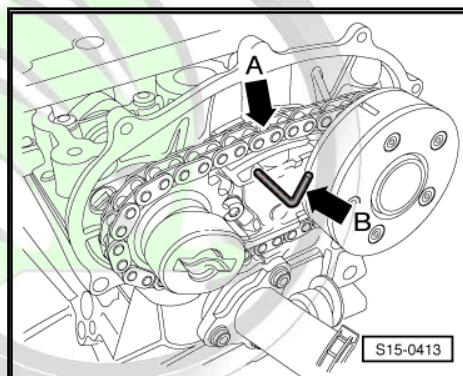
- Position the camshaft clamp - T10252- , as shown and secure -arrows-.

- Use the socket insert - T40080- to unscrew the securing bolt from the camshaft adjuster.



- Squeeze the chain tensioner -arrow A- and tighten with a 2 mm Allen key -arrow B-.

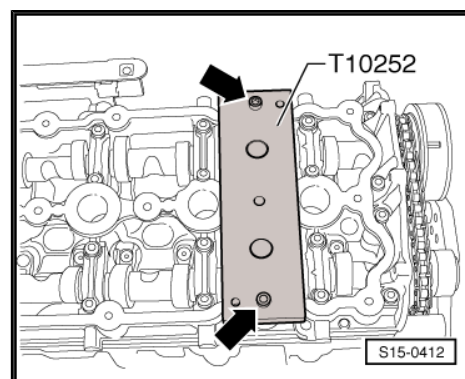
- Unscrew the securing bolts from the camshaft adjuster and remove the adjuster with the chain.



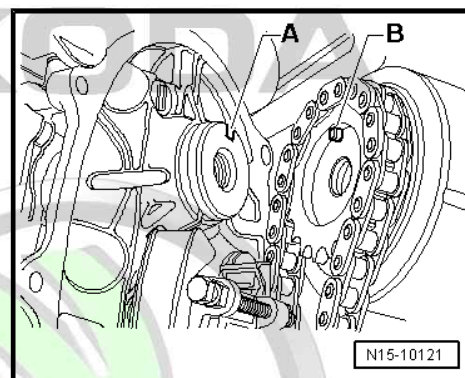
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## 5.2.2 Install

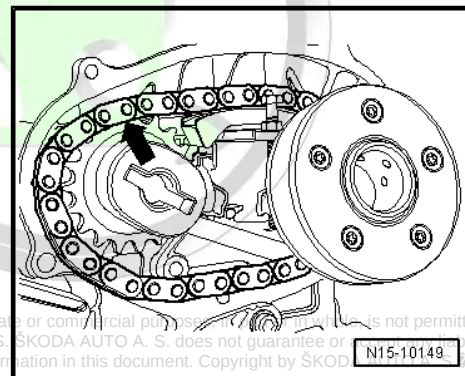
- The camshafts are secured by the camshaft clamp - T10252- .
- Chain tensioner is tensioned/locked
- Place chain on camshaft adjuster.



- Hold camshaft adjuster in front of exhaust camshaft so that notch -A- and pin -B- are facing each other.



- With the chain in this position starting at the top -arrow-, fit the sprocket of the inlet camshaft.



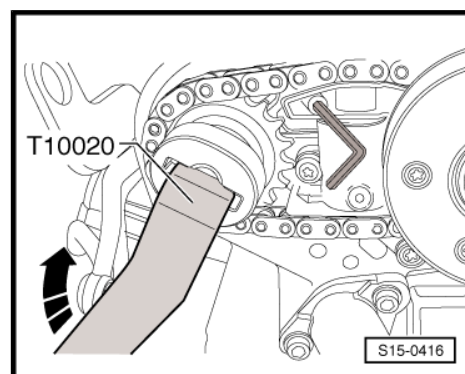
- Slowly turn the inlet camshaft with the pin wrench - T10020- in -direction of arrow A- until the camshaft adjuster fits onto the camshaft.



### Note

*If the pin does not fit into the notch: Remove the chain from the camshaft adjuster and fit it back onto the camshaft adjuster one chain link further along.*

- Tighten the new securing bolt for the camshaft adjuster to 20 Nm + torque a further 45° (1/8 turn). To do this use insertion tool - T40080- .







- Remove the Allen key -arrow B-.

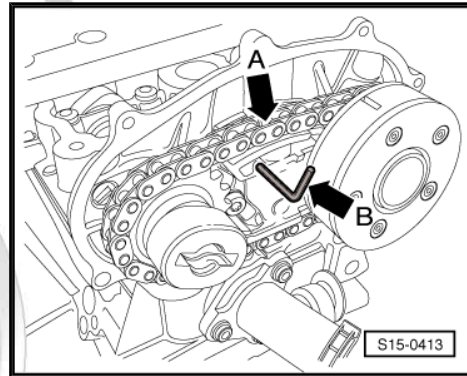
The further installation is carried out in reverse order to removal.  
Pay attention to the following:



#### Note

*If you cannot remove the camshaft clamp - T10252- , insert the puller - T10055- in the middle and use it to pull off the camshaft clamp - T10252- .*

- Follow the tightening sequence for the cylinder head cover  
⇒ [page 76](#) .



### 5.3 Removing and installing camshaft control valve 1 - N205- , engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### Special tools and workshop equipment required

- ♦ TORX bit set , e.g. -V.A.G 1766-
- ♦ 1/4" ratchet insert tool , e.g. -VAS 6234-
- ♦ Pliers for spring strap clamps

#### Removing



#### Note

*Always replace seals and gasket rings.*

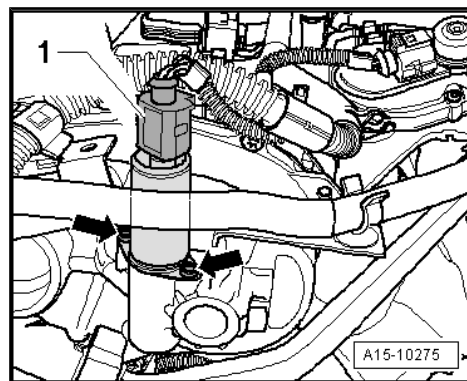
- Disconnect plug connection -1-.
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- from the housing.

#### Install



#### Note

- ♦ *Camshaft control valve 1 - N205- and the housing must be free of dirt and contamination.*
- ♦ *Only remove the new camshaft control valve 1 - N205- from the packaging just before installing.*



#### Caution

- ♦ *The camshaft control valve 1 - N205- must not be exposed to impacts or vibration.*

- Wet the sealing ring with engine oil.
- Carefully insert camshaft control valve 1 - N205- into the housing and press it in straight by hand up to the stop.
- Tighten screws to 4 Nm.

The further installation is carried out in reverse order to removal.



## 5.4 Removing and installing camshaft control valve 1 - N205- , engine identification characters BWA

### Special tools and workshop equipment required

- ◆ TORX bit set , e.g. -V.A.G 1766-
- ◆ 1/4" ratchet insert tool , e.g. -VAS 6234-
- ◆ Pliers for spring strap clamps

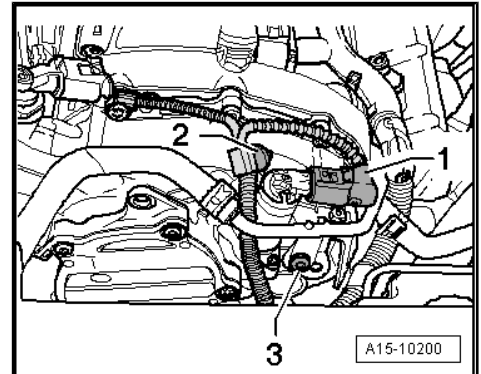
### Removing

- Disconnect plug connection -1-.
- Detach the wiring harness -2- from the bracket.
- Unscrew bolt -3-.



#### Note

*Do not pull camshaft control valve 1 - N205- out by the plug.*



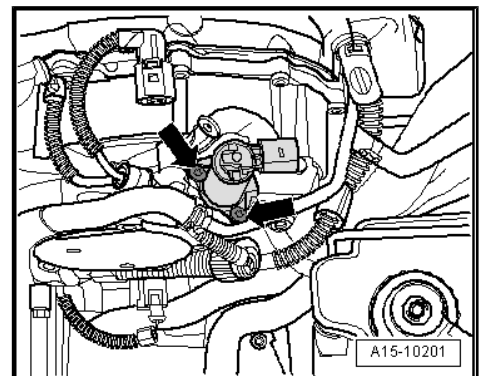
- Unscrew bolts -arrows- and remove camshaft control valve 1 - N205- from the housing.

### Install



#### Note

- ◆ *Camshaft control valve 1 - N205- and the housing must be free of dirt and contamination.*
- ◆ *Only remove the new camshaft control valve 1 - N205- from the packaging just before installing.*



#### Caution

- ◆ *The camshaft control valve 1 - N205- must not be exposed to impacts or vibration.*

- Wet the sealing ring with engine oil.
- Carefully insert camshaft control valve 1 - N205- into the housing and press it in straight by hand up to the stop.
- Tighten screws to 4 Nm.

The further installation is carried out in reverse order to removal.

## 5.5 Removing and installing camshafts

### Special tools and workshop equipment required

- ◆ Counterholder - MP1-216 (3036)-
- ◆ Thrust piece - T10174-
- ◆ Supporting device - T30099-
- ◆ Extractor - T40001-



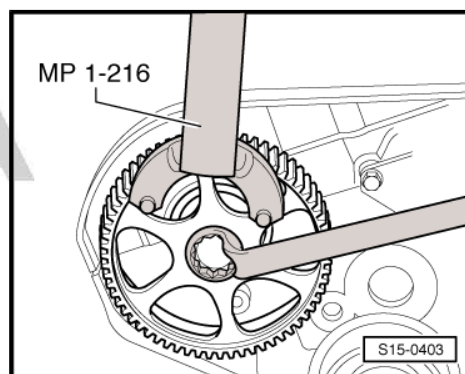
- ◆ Sealant - D 154 103 A1-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-

### 5.5.1 Removing

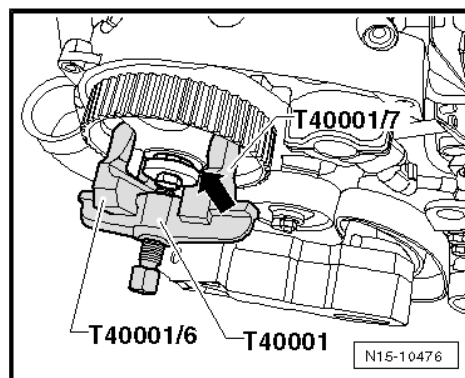


#### Note

- ◆ *The sealing surfaces on the bottom of the ladder frame and on the top of the cylinder head must not be machined.*
- ◆ *The camshaft bearings are integrated into the cylinder head and ladder frame. Before removing the ladder frame, the toothed belt must be de-tensioned.*
- ◆ *If the ladder frame has been loosened, the sealing ring of the camshaft and the cap must be replaced.*
- Remove camshaft control ⇒ [page 109](#) .
- Detach the camshaft clamp - T10252- .
- Take toothed belt off camshaft sprocket.
- ◆ Engines without split toothed belt guard ⇒ [page 40](#) .
- ◆ Engines with split toothed belt guard ⇒ [page 50](#) .
- Loosen bolt of camshaft sprocket. Use counterholder - MP1-216- for this purpose.



- Unscrew bolt of camshaft sprocket approx. 10 mm -arrow-.
- Remove camshaft sprocket with puller - T40001- , claw - T40001/6- and claw - T40001/7- .
- Remove the securing bolt and bolt for the camshaft sprocket.
- Remove rear toothed belt guard from cylinder head.
- Unscrew bolts of the ladder frame the same amount from outside to inside and take off the ladder frame.
- Carefully lift out camshafts and place down on a clean surface.

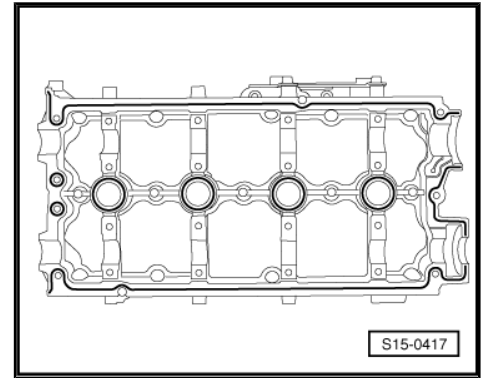


#### WARNING

***Wear protective gloves when working with sealant and grease remover.***

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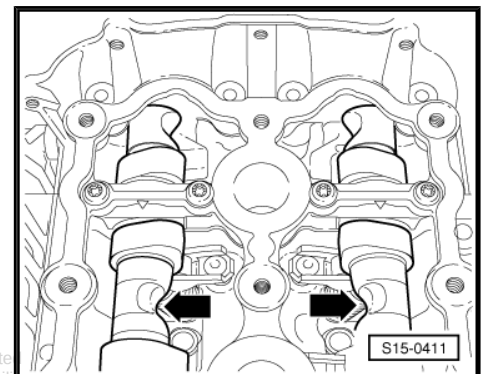
- Use a chemical sealant remover to remove the old sealant from the grooves of the ladder frame and from all sealing surfaces of the ladder frame and cylinder head.  
Ensure that no dirt and sealant residues get into the cylinder head.
- Degrease the sealing surfaces.



### 5.5.2 Install

#### Note

- ◆ *The sealing surfaces must be free of oil and grease.*
- ◆ *The pistons must not be positioned at top dead centre!*
- ◆ *Make sure that all roller rocker fingers correctly rest on the end of the valve stem.*
- Oil the contact surfaces of the camshaft.
- Carefully insert the camshafts into the camshaft bearings of the cylinder head. The recesses -arrows- must be perpendicular to each other.

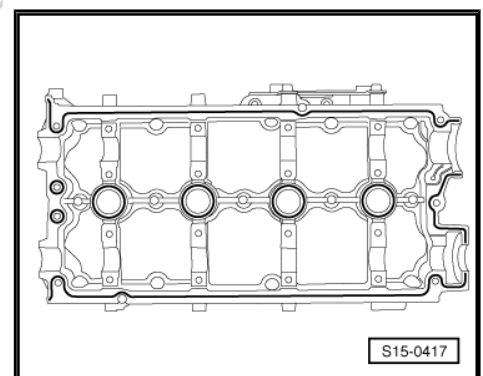


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- Apply an even, slightly domed adhesive bead of sealant - D 154 103 A1- to the clean grooves of the ladder frame.

#### Note

- ◆ *Pay attention to the use by date on sealant.*
- ◆ *The sealant must not be applied too thick. Wipe off any excess sealant with a lint-free cleaning cloth.*
- ◆ *Position and bolt on the ladder frame immediately, because the sealant begins to harden as soon as the sealing surfaces come into contact.*



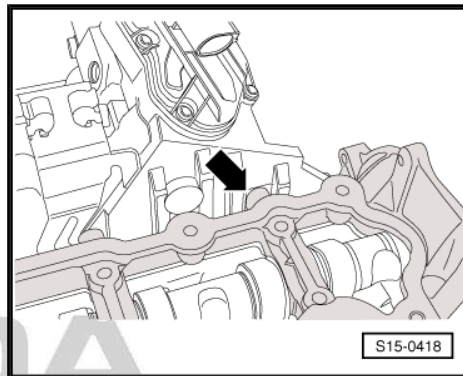
Vehicles with engine identification characters BLR, BLX, BVX, BVY



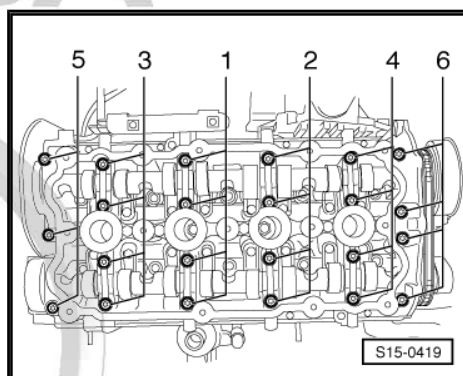
- Fit the ladder frame -arrow- so that it does not come into contact with the exhaust gas recirculation valve - N18- .

#### Continued for all vehicles

- Tighten the new bolts slightly in several stages from inside to outside.



- Tighten the bolts to 8 Nm in the sequence shown from inside to outside.
- Then torque the bolts a further 90° (1/4 turn) in the sequence shown.
- Drive in the cap ( ➔ [page 100](#) , Pos. 26) with thrust piece - T10174- up to the stop.
- Install a new camshaft sealing ring ➔ [page 107](#) .
- Install rear toothed belt guard.
- Insert the key into the camshaft.



- Install camshaft timing gear. To tighten the new bolt, hold the camshaft sprocket with the counterholder - MP1-216- .

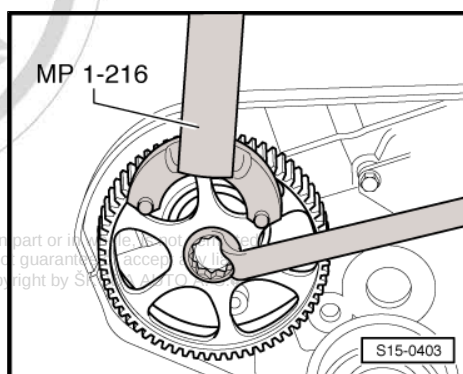
Tightening torque: 50 Nm + torque a further 180° (1/2 turn).



#### Note

- ♦ *When turning the camshaft, the piston must not be at TDC. Risk of damaging valves and pistons.*
- ♦ *Make sure that the key is seated correctly.*

The further installation is carried out in reverse order to removal.



## 17 – Lubrication

### 1 Parts of the lubrication system - part 1



#### Note

- ◆ If considerable quantities of metal swarf or grit are found in the engine oil when carrying out engine repairs, carefully clean the oil galleries to avoid secondary damage and also replace the engine oil cooler, the oil injection nozzles and the oil filter element.
- ◆ The oil level must not be above the max. mark - danger of damage to catalytic converter!

Inspecting oil pressure ⇒ [page 134](#) .

Check the oil level, amount of oil and oil specification ⇒ Maintenance ; Booklet Octavia II

#### 1.1 Summary of components

1 - 15 Nm

2 - Dipstick

- ☐ oil level must not exceed max. marking!

3 - Hopper

- ☐ to remove, carefully press off the guide tube from bottom to top

4 - Guide tube

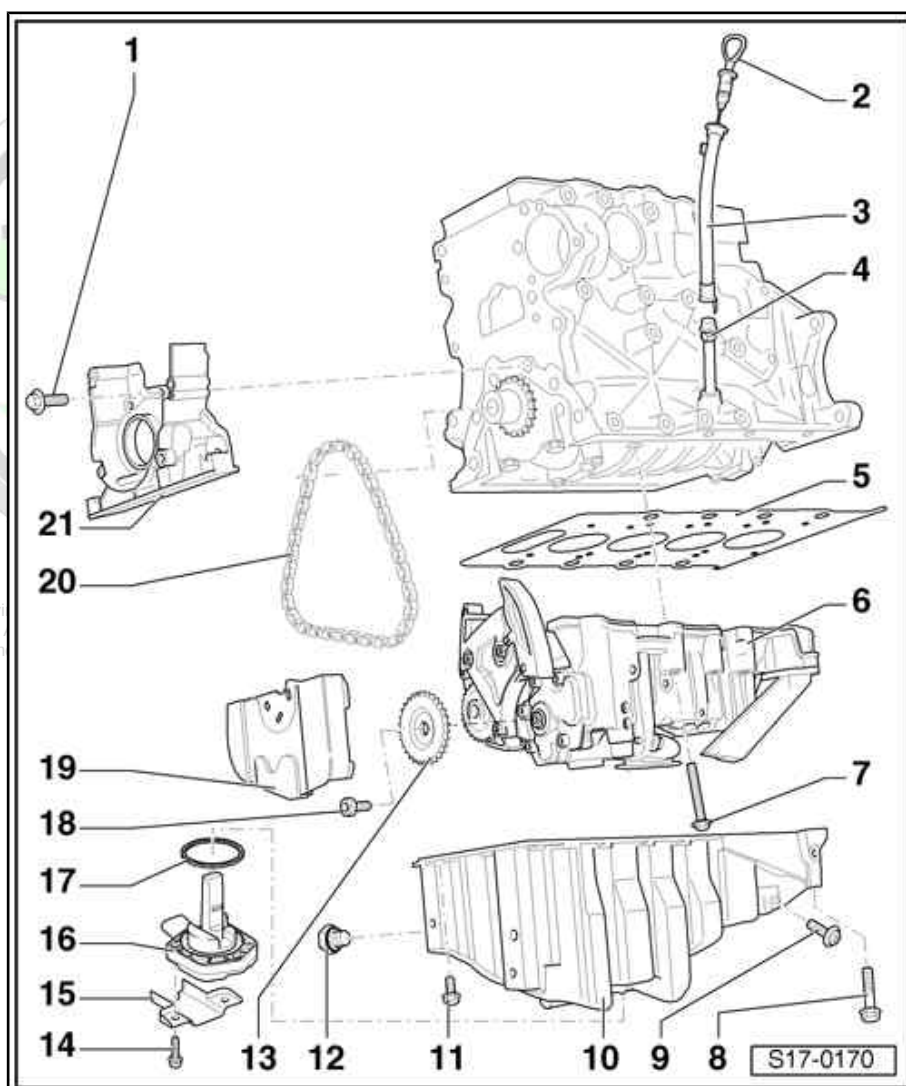
5 - Intermediate plate

- ☐ Engine identification characters BLR, BLX, BLY:  
replace
- ☐ removing and installing  
⇒ [page 127](#)

6 - Balancing shaft module with oil pump

- ☐ with pressure relief valve 0.12 MPa (12 bar)
- ☐ Summary of components ⇒ [page 119](#)
- ☐ removing and installing  
⇒ [page 127](#)
- ☐ Engine identification characters BLR, BLX, BLY:

If the balancing shaft module with oil pump has been removed, the intermediate plate must be replaced.







## 7 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ pay attention to the different bolt lengths ⇒ [page 127](#)

## 8 - 15 Nm

## 9 - 8 Nm

- ☐ Only installed for engine identification characters BWA (to secure the charge air pipe)

## 10 - Oil pan

- ☐ Clean sealing surface before fitting.
- ☐ removing and installing ⇒ [page 124](#)
- ☐ if the oil pan has been removed, the intermediate plate must be replaced (Pos. 5)

## 11 - 15 Nm

## 12 - Oil drain plug, 30 Nm

- ☐ with captive seal
- ☐ replace

## 13 - Sprocket

- ☐ for oil pump

## 14 - 10 Nm

- ☐ Not for engine identification characters BLY, BVZ

## 15 - Protective cap

- ☐ Not for engine identification characters BLY, BVZ

## 16 - Oil level and oil temperature sender - G266-

- ☐ Not for engine identification characters BLY, BVZ

## 17 - Sealing ring

- ☐ replace
- ☐ Moisten with oil before installing
- ☐ Not for engine identification characters BLY, BVZ

## 18 - 20 Nm + torque a further 90° (1/4 turn)

## 19 - Chain cover

## 20 - Chain

## 21 - Sealing flange on the belt pulley side

- ☐ must be positioned on dowel sleeves
- ☐ removing and installing ⇒ [page 63](#)
- ☐ remove oil pan for removing and installing ⇒ [page 124](#)
- ☐ replace the gasket ring for the crankshaft - on the belt pulley side ⇒ [page 61](#)

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## 1.2 Balancing shaft module with oil pump - summary of components, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

### 1 - Chain cover

### 2 - Chain

- ☐ before removing, mark the direction of rotation (installation position) in colour

### 3 - Fitting sleeve

### 4 - Balancing shaft module

- ☐ removing and installing ⇒ [page 127](#)
- ☐ Before installing, check whether both dowel sleeves for centering are present (Pos. 3)

### 5 - 3 Nm

- ☐ insert using locking agent

### 6 - Cover

- ☐ prevents the engine oil foaming

### 7 - Oil return fittings

- ☐ with gasket

### 8 - 9 Nm

### 9 - Oil suction pipe

- ☐ Clean strainer if dirty

### 10 - 8 Nm

### 11 - O-ring

- ☐ replace

### 12 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ pay attention to the different bolt lengths ⇒ [page 129](#)

### 13 - O-ring

- ☐ replace

### 14 - Screw plug, 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace

### 15 - Fitting sleeve

### 16 - Outer rotor

- ☐ Check contact surfaces for scoring
- ☐ Marking must be visible

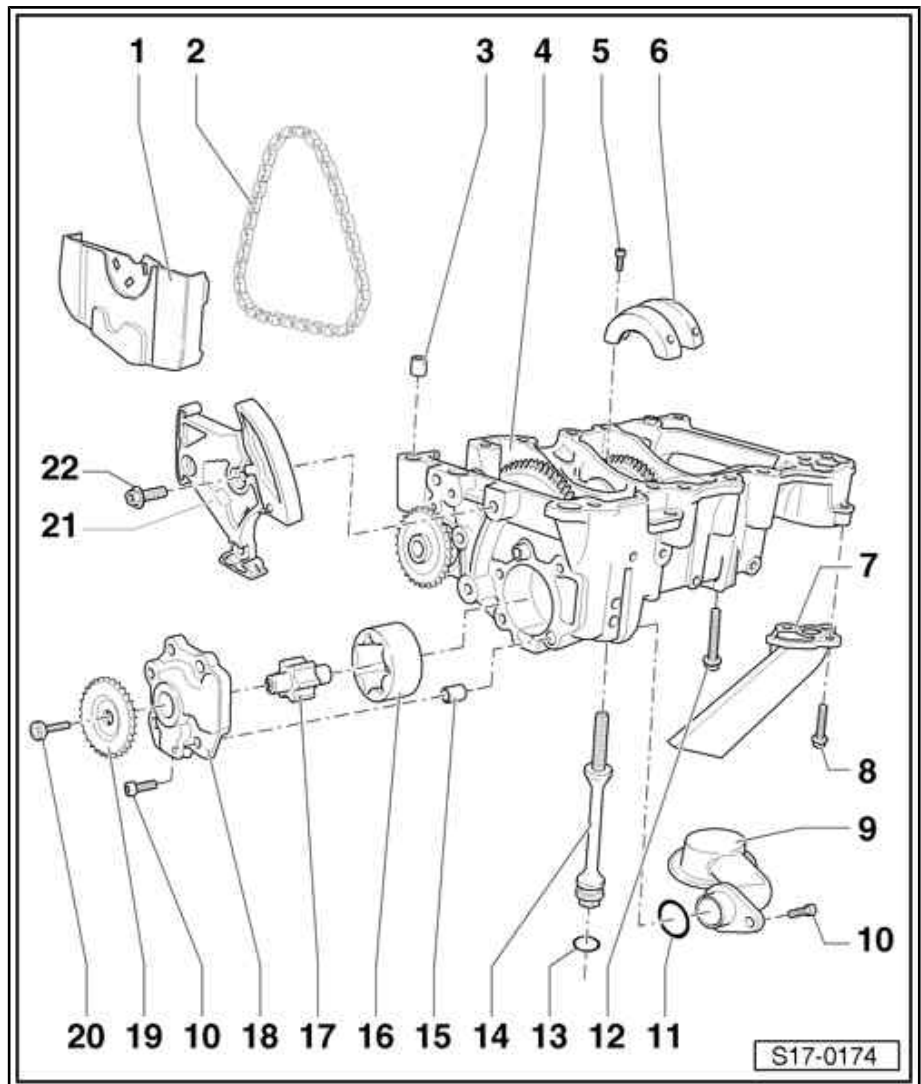
### 17 - Inner rotor

- ☐ Check contact surfaces for scoring

### 18 - Oil pump cover

### 19 - Sprocket

- ☐ for oil pump





20 - 20 Nm + torque a further 90° (1/4 turn)

- ☐ replace

21 - Chain tensioner with tensioning rail

- ☐ for installation, tension and lock ➔ [page 131](#)

22 - 15 Nm

### 1.3 Balancing shaft module with oil pump - summary of components, engine identification characters BWA

1 - Chain cover

2 - Chain

- ☐ before removing, mark the direction of rotation (installation position) in colour

3 - Fitting sleeve

4 - Intermediate plate

5 - Balancing shaft module with oil pump

- ☐ removing and installing ➔ [page 127](#)
- ☐ Before installing, check whether both dowel sleeves for centering are present (Pos. 3)

6 - 9 Nm

7 - Cover

- ☐ prevents the engine oil foaming

8 - 40 Nm

9 - 8 Nm

10 - Oil suction pipe

- ☐ Clean strainer if dirty

11 - O-ring

- ☐ replace

12 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ pay attention to the different bolt lengths ➔ [page 129](#)

13 - O-ring

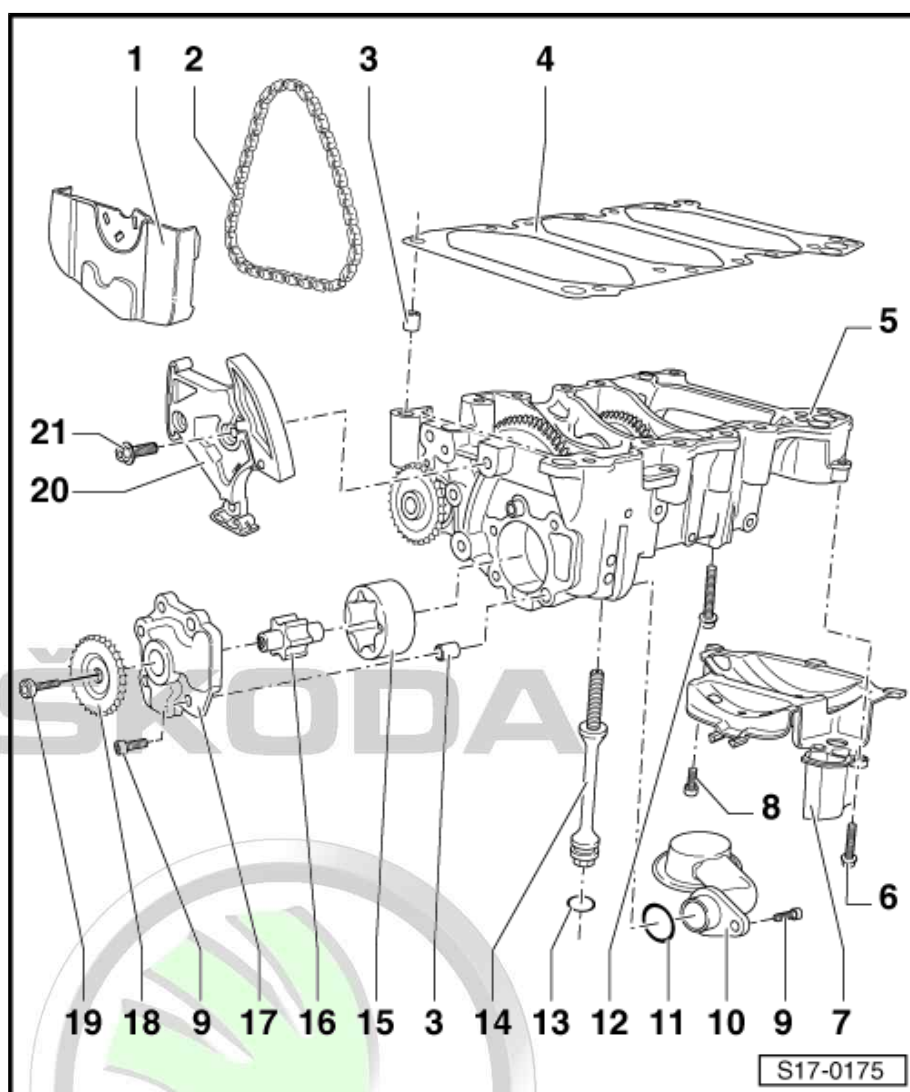
- ☐ replace

14 - Screw plug, 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace

15 - Outer rotor

- ☐ Check contact surfaces for scoring
- ☐ Marking must be visible



#### 16 - Inner rotor

- ☐ Check contact surfaces for scoring

#### 17 - Oil pump cover

#### 18 - Sprocket

- ☐ for oil pump

#### 19 - 20 Nm + torque a further 90° (1/4 turn)

- ☐ replace

#### 20 - Chain tensioner with tensioning rail

- ☐ for installation, tension and lock ➔ [page 131](#)

#### 21 - 15 Nm

### 1.4 Oil filter holder with add-on parts - summary of components, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### 1 - Pipe section

- ☐ for crankcase ventilation

#### 2 - Spring strap clamp

#### 3 - Oil filter holder

- ☐ with pressure relief valve approx. 0.4 MPa (4 bar)
- ☐ Do not loosen the screw plug for pressure relief valve
- ☐ removing and installing ➔ [page 132](#)

#### 4 - Gasket

- ☐ replace

#### 5 - Engine oil cooler

- ☐ pay attention to the notes ➔ [page 117](#)
- ☐ ensure clearance to surrounding components
- ☐ Coolant hose schematic diagram ➔ [page 141](#)

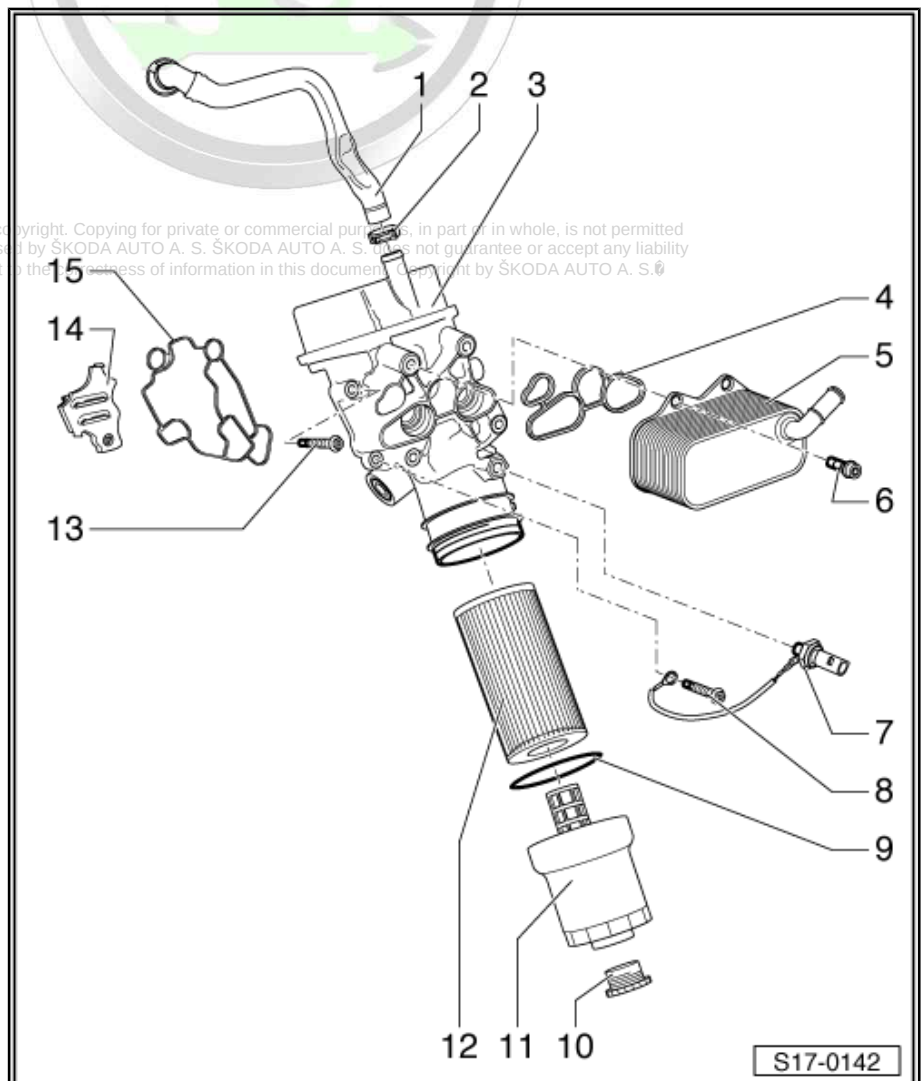
#### 6 - 25 Nm

#### 7 - Oil pressure switch - F1-, 20 Nm

- ☐ 0.14 MPa (1.4 bar), black
- ☐ up to 05.2005, single-pin with earth cable, then two-pin
- ☐ check ➔ [page 134](#)

#### 8 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace





## 9 - Sealing ring

- ☐ replace

## 10 - Dust cap

## 11 - Oil filter housing, 25 Nm

- ☐ Remove and install with oil filter tool .
- ☐ empty ➔ [page 124](#)

## 12 - Oil filter element

- ☐ empty oil filter housing before removing ➔ [page 124](#)

## 13 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace

## 14 - Partition panel

## 15 - Gasket

- ☐ replace

# 1.5 Oil filter holder with add-on parts - summary of components, engine identification characters BWA

## 1 - Pipe section

- ☐ for crankcase ventilation

## 2 - Oil pressure switch - F1- , 20 Nm

- ☐ 0.14 MPa (1.4 bar), black
- ☐ two-pin
- ☐ check ➔ [page 134](#)

## 3 - Support

## 4 - 25 Nm

## 5 - Engine oil cooler

- ☐ pay attention to the notes ➔ [page 117](#)
- ☐ ensure clearance to surrounding components
- ☐ Coolant hose schematic diagram ➔ [page 148](#) .

## 6 - Gasket

- ☐ replace

## 7 - 15 Nm + torque a further 90° (1/4 turn)

- ☐ replace

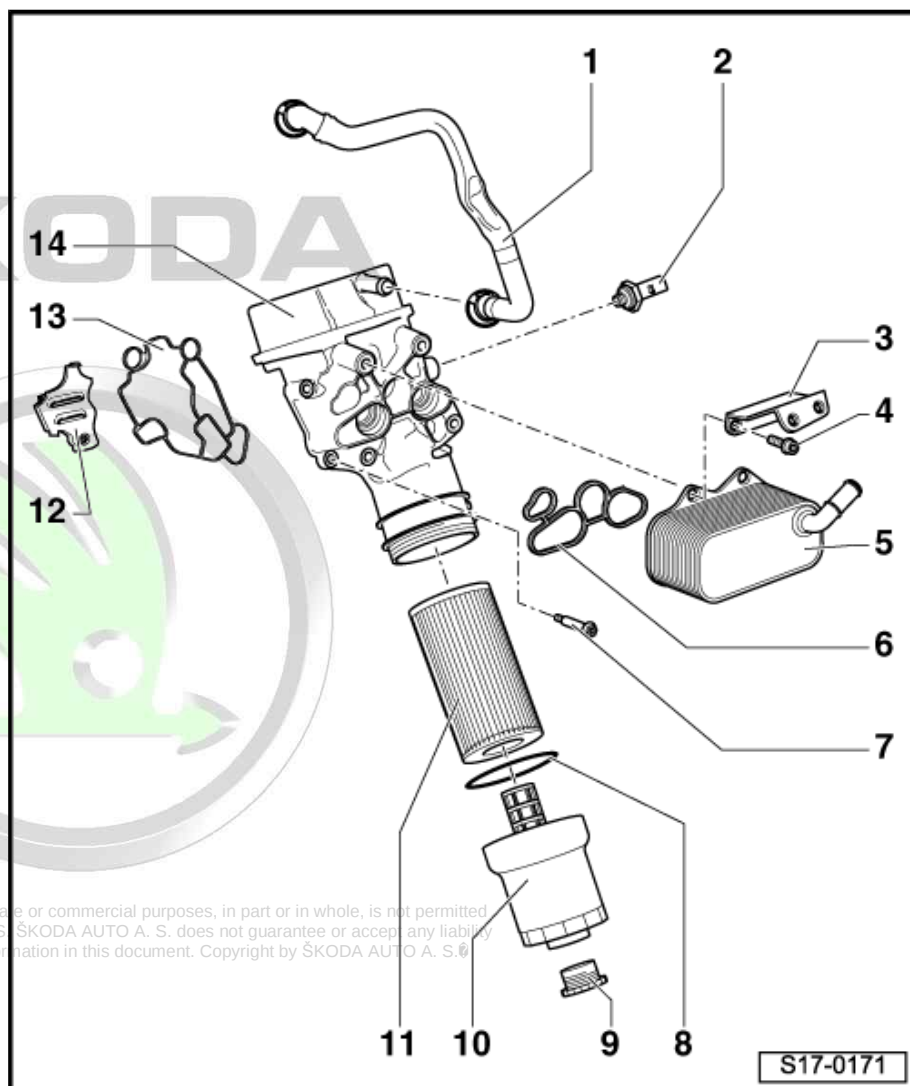
## 8 - Sealing ring

- ☐ replace

## 9 - Dust cap

## 10 - Oil filter housing, 25 Nm

- ☐ Remove and install with oil filter tool .
- ☐ empty ➔ [page 124](#)





#### 11 - Oil filter element

- ☐ empty oil filter housing before removing ⇒ [page 124](#)

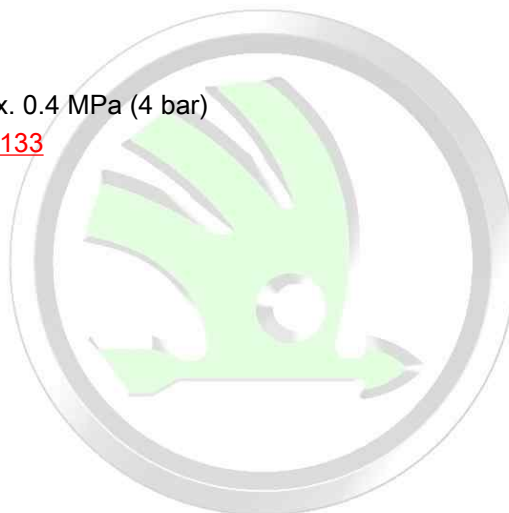
#### 12 - Partition panel

#### 13 - Gasket

- ☐ replace

#### 14 - Oil filter holder

- ☐ with pressure relief valve approx. 0.4 MPa (4 bar)
- ☐ removing and installing ⇒ [page 133](#)



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## 2 Parts of the lubrication system - part 2

### 2.1 Emptying the oil filter housing

#### Special tools and workshop equipment required

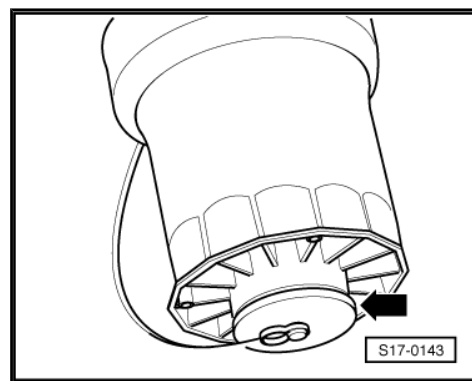
- ◆ Oil drain adapter - T40057-



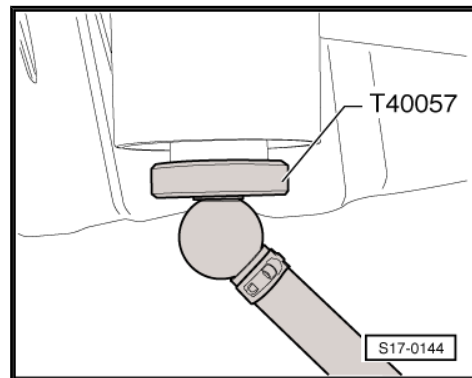
#### Note

*Screwing in the oil drain adapter - T40057- opens the valve in the oil filter housing. Screwing out the oil drain adapter - T40057- closes the valve again.*

- Remove the dust cap -arrow- from the oil filter housing.



- Hold the hose from the oil drain adapter - T40057- into the catch pan and rotate the oil drain adapter - T40057- into the oil filter housing.
- Drain the engine oil.



### 2.2 Removing and installing oil pan

#### Special tools and workshop equipment required

- ◆ Flexible-head wrench SW 10 , e.g. -3185-
- ◆ Socket insert SW 5 , e.g. -3249- or socket insert - T10058-
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Silicone sealant - D 176 404 A2-

#### Removing

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50

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- Drain off engine oil.



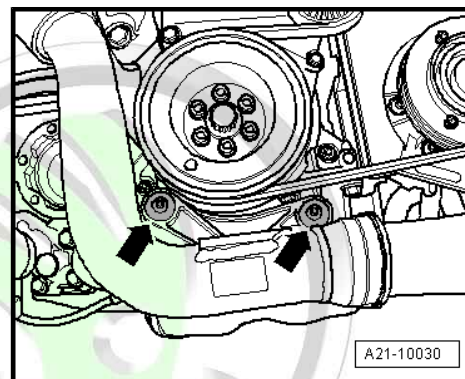
**Note**

*Please observe all disposal instructions!*

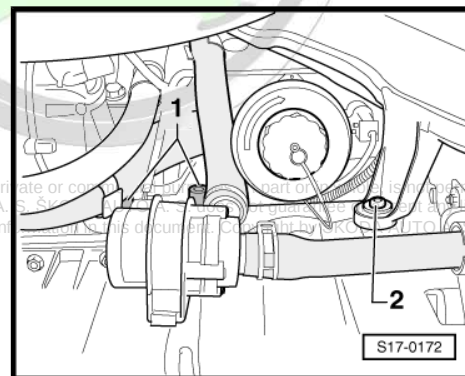
ŠKODA

**Vehicles with engine identification characters BWA**

- Unscrew the bolts -arrows-, disconnect the quick couplers and remove the charge air pipe.



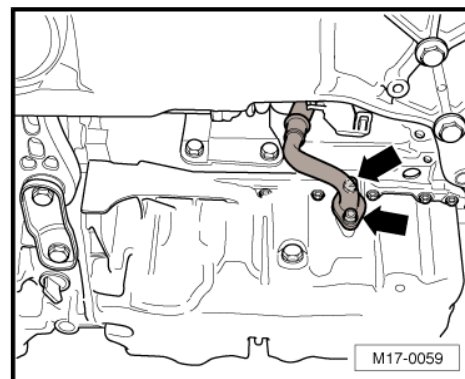
- Unscrew bolts -1- from bracket for coolant recirculation pump - V51- .
- Unscrew bolt -2- from the charge air pipe.



- Detach oil return line -arrows-.

**Continued for all vehicles**

- Disconnect plug from oil level and oil temperature sensor - G266- where it is installed.





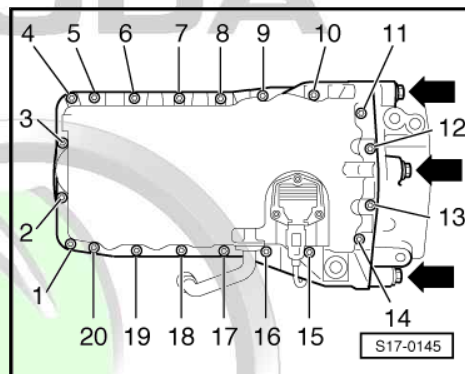
- Unscrew the securing bolts of oil pan/gearbox -arrows-.
- Unscrew the screws -1- to -20-.



### Note

*Loosen the oil pan bolts on the flywheel side -12- and -13- with the flexible-head wrench SW 10 - 3185- and unscrew them with the socket insert - T10058-.*

- Removing the oil pan. Loosen sump with light blows of a rubber headed hammer if necessary.



### Vehicles with engine identification characters BLR, BLX, BLY

- Remove balancing shaft module with oil pump and the intermediate plate ⇒ [page 127](#) .

### Install

### Vehicles with engine identification characters BLR, BLX, BLY



### Note

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- ♦ *After removing the oil pan, the intermediate plate must be replaced.*
- ♦ *The oil pan must be installed and tightened on the new intermediate plate immediately after fitting the balancing shaft module with oil pump.*



### WARNING

***Wear protective gloves when working with sealant and grease remover.***

- Clean the sealing surface of the oil pan. They must be free of oil and grease.
- Install balancing shaft module with oil pump ⇒ [page 127](#) .

### Vehicles with engine identification characters BVX, BVY, BVZ, BWA



### WARNING

***Wear protective gloves when working with sealant and grease remover.***

- Clean sealing surface on cylinder block and on the oil pan and remove sealant residues with chemical sealant remover.
- Degrease the sealing surfaces.



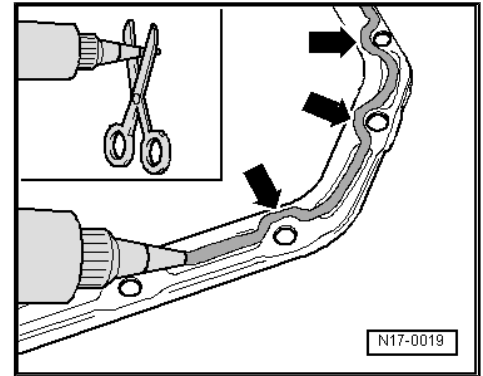
### Note

- ♦ *Pay attention to the use by date on sealant.*
- ♦ *The oil pan must be installed and tightened firmly immediately after applying the sealant.*

- Cut off nozzle tube at the front marking ( $\varnothing$  of nozzle approx. 3 mm).
- Apply silicone sealant to clean sealing surface of oil pan, as shown. Sealant bead must
  - ◆ 2...3 mm thick
  - ◆ run past the area around the bolt holes on the inside -arrows-

**i Note**

*The sealant bead must not be thicker otherwise excess sealant may get into the oil pan and block the strainer in the oil pump suction pipe.*

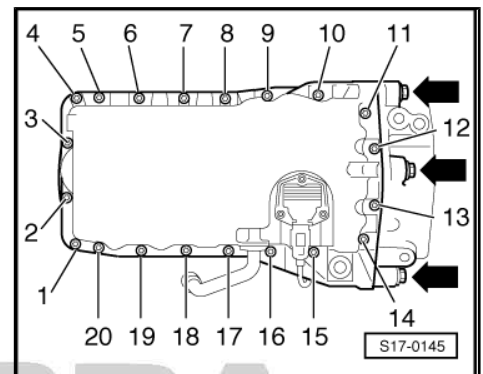


**Continued for all vehicles**

- Then immediately fit the oil pan and tighten the bolts as follows:
  - 1 - Only tighten bolts -1- to -20- crosswise very slightly
  - 2 - Tighten the bolts of oil pan/gearbox -arrows- slightly
  - 3 - Tighten bolts -1- to -20- crosswise slightly
  - 4 - Tighten the bolts of the oil pan/gearbox -arrows- to 40 Nm
  - 5 - Tighten bolts -1- to -20- crosswise to 15 Nm

**i Note**

- ◆ *If the oil pan is fitted to the engine when the gearbox is not installed, the oil pan must be end flush with the cylinder block.*
- ◆ *After installing the oil pan, allow the sealant to dry for about 30 minutes. Only then may engine oil be filled in.*



The further installation is carried out in reverse order to removal.

## 2.3 Removing and installing balancing shaft module with oil pump

### Special tools and workshop equipment required

- ◆ Rig pin - T10027A-
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Silicone sealant - D 176 404 A2-

### 2.3.1 Removing

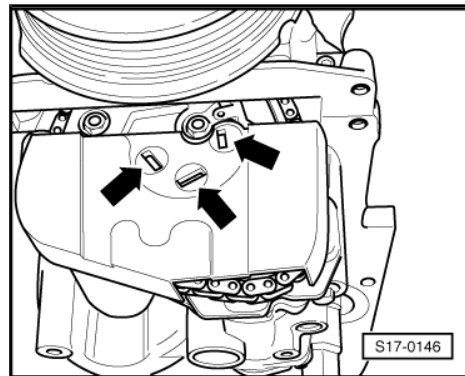
- Removing the oil pan ➔ [page 124](#) .

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- Remove chain cover. Unlock the retaining tabs with a small screwdriver, if necessary through the openings -arrows-.

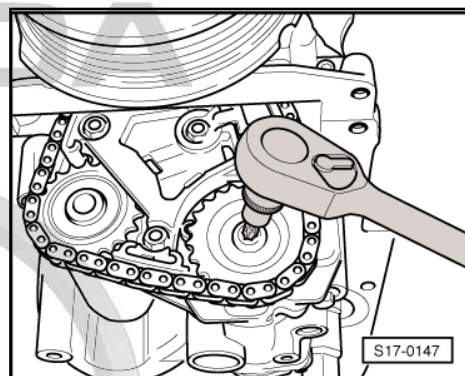


- Unscrew the bolt from the sprocket of the oil pump. While doing so, counterhold at the centre bolt of the crankshaft.

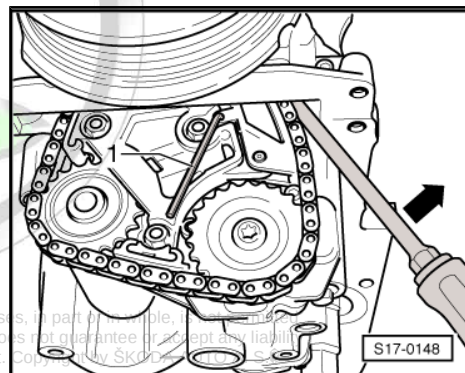


**Caution**

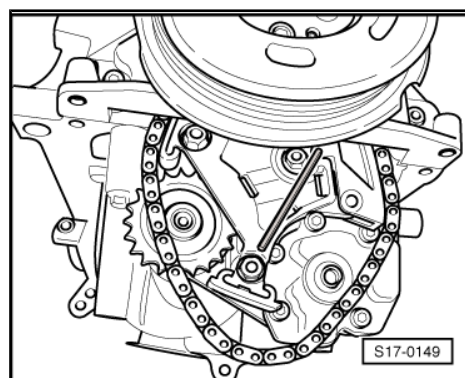
*The sprocket to drive the balancing shafts must not be loosened!*



- Detension chain guide with a screwdriver -arrow- and lock with a 3 mm Allen key -1-.

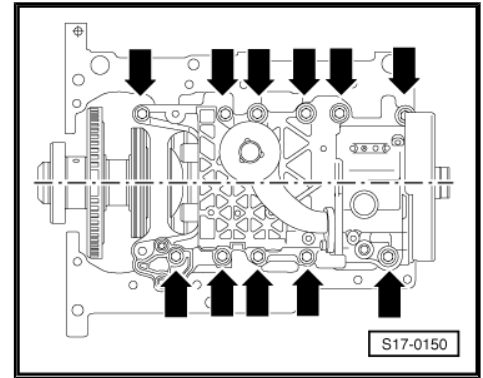


- Detach sprocket of the oil pump and remove the chain from the sprocket of the balancing shaft.



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- Unscrew bolts -arrows- of the balancing shaft module from outside to inside and remove the balancing shaft module.
- Remove the intermediate plate.



### 2.3.2 Installing and setting

- Chain tensioner tensioned and locked ➔ [page 131](#)

Vehicles with engine identification characters BLR, BLX, BLY

#### Note

- ◆ Always replace the intermediate plate.
- ◆ Pay attention to the use by date on sealant.
- ◆ The balancing shaft module with intermediate plate and the oil pan must be installed and tightened firmly immediately after applying the silicone sealant.



#### WARNING

***Wear protective gloves when working with sealant and grease remover.***

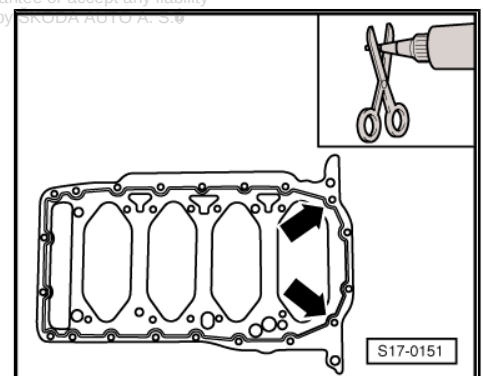
- Clean sealing surface on cylinder block and remove sealant residues with chemical sealant remover.
- Degrease the sealing surface.
- Cut off nozzle tube at the front marking (Ø of nozzle approx. 3 mm).
- Apply silicone sealant to clean sealing surface of the new intermediate plate as shown.

Pay attention to the following points:

- ◆ The sealant bead point towards the cylinder block. The oil pan side of the intermediate plate has a seal.
- ◆ The adhesive bead must be 2...3 mm thick.
- ◆ The sealant bead must run past the area of bolt holes on the inside -arrows-.

#### Note

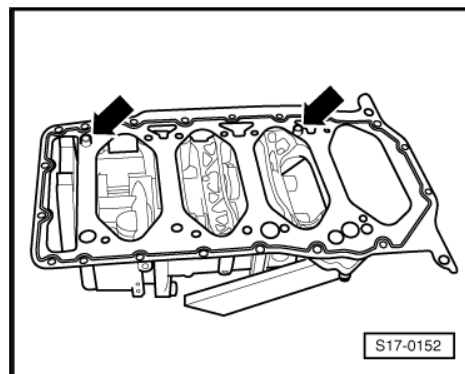
***The sealant bead must not be thicker otherwise excess sealant may get into the oil pan and block the strainer in the oil pump suction pipe.***





- Fit intermediate plate, as shown, onto the dowel sleeves -arrows- of the balancing shaft module.

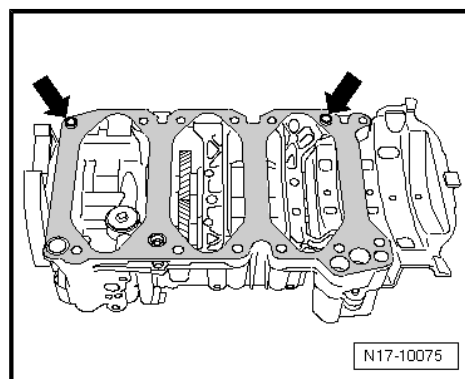
**Vehicles with engine identification characters BVX, BVY, BVZ, BWA**



- Fit intermediate plate, as shown, onto the dowel sleeves -arrows- of the balancing shaft module.

**Continued for all vehicles**

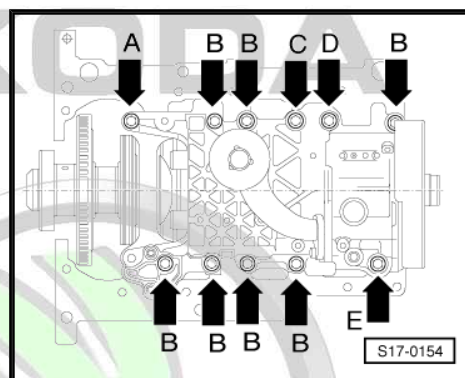
- Install the balancing shaft module with oil pump and intermediate plate. Replace O-ring of the screw plug:
- ♦ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ ➔ [page 119](#) , Pos. 13.
- ♦ Engine identification characters BWA ➔ [page 120](#) , Pos. 13.
- Tighten the new securing bolts -arrows- to 15 Nm + 90° (1/4 turn) from inside to outside.



**Assignment of screws**

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**

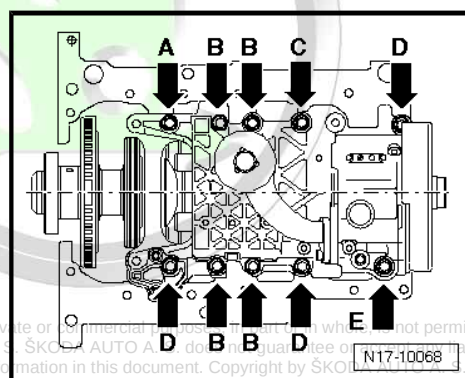
- A - Bolt M7 x 40
- B - Bolt M7 x 55
- C - Bolt M7 x 90
- D - Bolt M7 x 115
- E - Screw plug with O-ring. Replace O-ring.



**Vehicles with engine identification characters BWA**

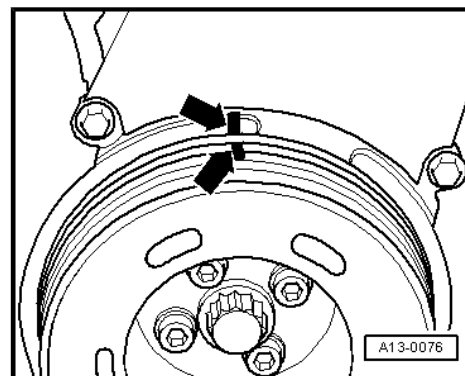
- A - Bolt M7 x 40
- B - Bolt M7 x 70
- C - Bolt M7 x 90
- D - Bolt M7 x 55
- E - Screw plug with O-ring. Replace O-ring.

**Continued for all vehicles**



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- Position crankshaft on TDC for cylinder 1.

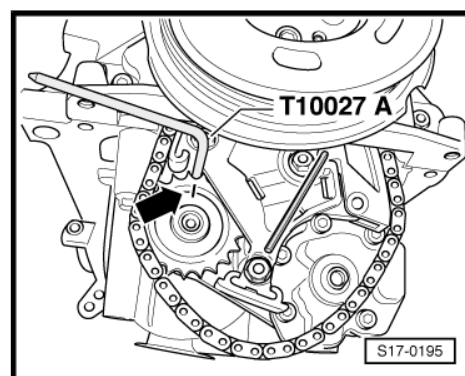


- Turn the sprocket of the balancing shaft so that the marking -arrow- is opposite the locating hole. Lock the sprocket in this position with the locking pin - T10027A- . Fit the chain onto the chain sprocket of the balancing shaft.
- Install the chain sprocket of the oil pump and tighten the screw by hand.



**Note**

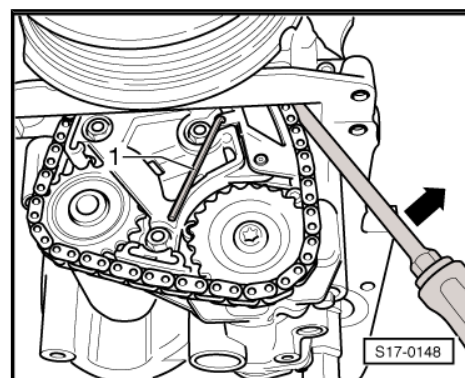
*The sprocket of the oil pump only fits in one position. Only the oil pump may be turned during installation.*



- Remove the locking pin - T10027A- and the Allen key -1-. Tighten bolt of chain sprocket of oil pump. While doing so, counterhold at the centre bolt of the crankshaft.

Tightening torque: 20 Nm + torque a further 90° (1/4 turn)

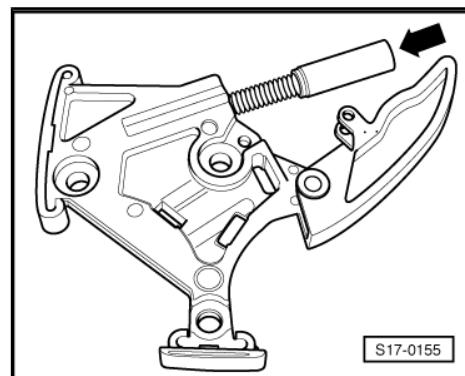
- Then immediately install the oil pan ⇒ [page 124](#) .



### 2.3.3 Tensioning and locking the chain tensioner

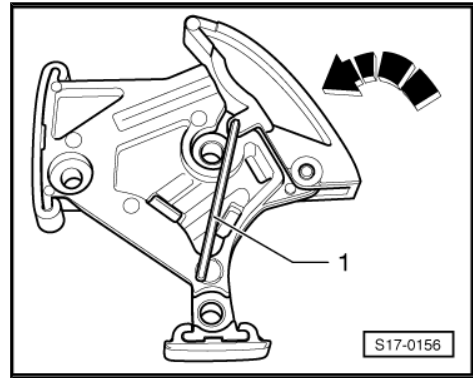
- Press in the piston by hand -arrow-.

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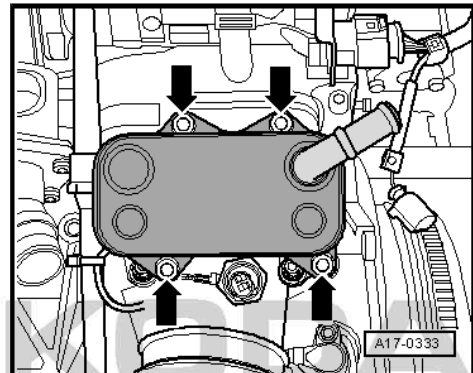
- Push the chain guide in -direction of arrow- and lock with a 3 mm Allen key -1-.



## 2.4 Removing and installing oil filter holder, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

### Removing

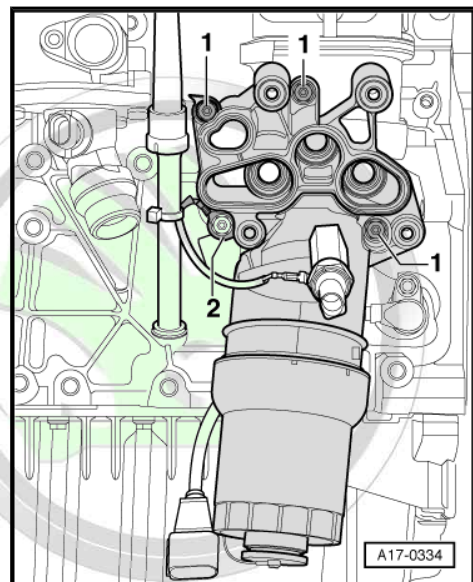
- Removing the intake manifold ➔ [page 243](#) .
- Remove bottom coolant pipe ➔ [page 161](#) .
- Remove engine oil cooler -arrows-.



- On vehicles up to 05.2005, disconnect the earth cable for the oil pressure switch.
- Unscrew bolts -1- and -2- and remove the oil filter holder.

### Install

- Replace seals ( ➔ [page 121](#) , Pos. 4) and ( ➔ [page 121](#) , Pos. 15).
- Fit baffle ( ➔ [page 121](#) , Pos. 14).



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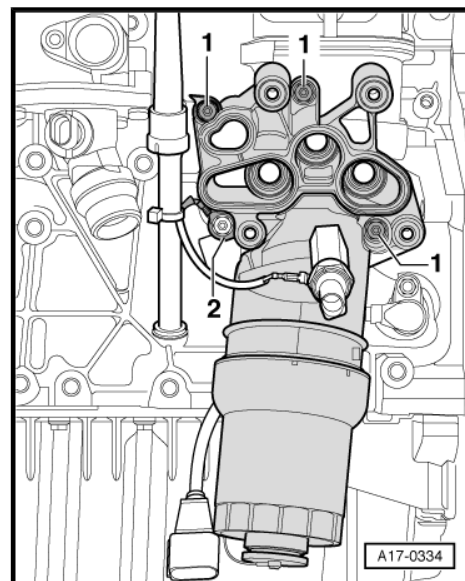


- Install oil filter holder, tighten bolts -1- and -2- uniformly to 15 Nm and torque a further + 90° (1/4 turn).



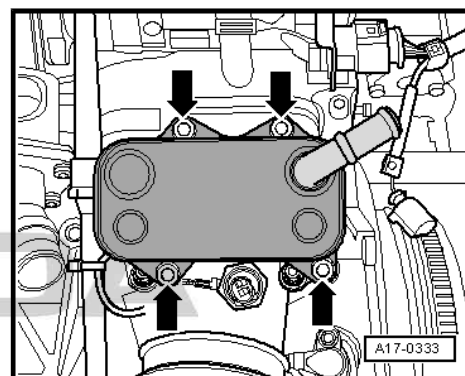
#### Note

*On vehicles up to 05.2005, the earth cable for the oil pressure switch has to be secured to the guide tube for the oil dipstick with bolt -2- and a cable strap.*



- Install engine oil cooler -arrows-.

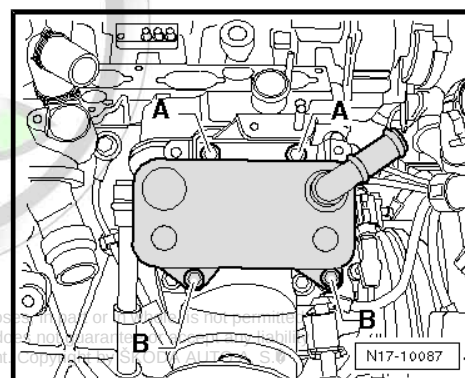
The further installation is carried out in reverse order to removal.



## 2.5 Removing and installing oil filter holder, engine identification characters BWA

### Removing

- Removing the intake manifold ➔ [page 247](#) .
- Remove coolant pipes ➔ [page 162](#) .
- Remove engine oil cooler. To do so, unscrew bolts -A- and -B-.



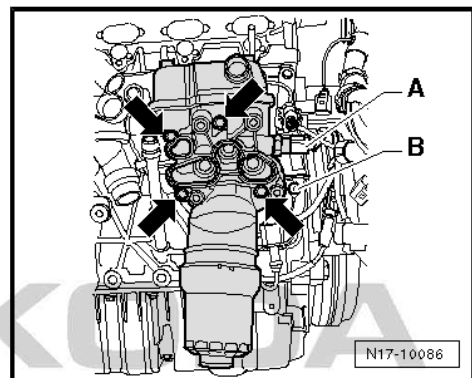
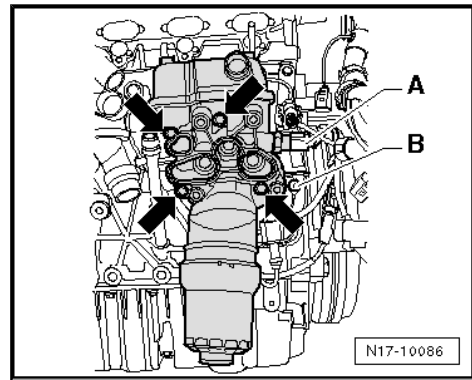
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- Disconnect plug -A- from the oil pressure switch.
- Unscrew securing bolts -arrows- and remove the oil filter holder.

#### Install

- Replace seals ( ➔ [page 122](#) , Pos. 6) and ( ➔ [page 122](#) , Pos. 13).
  - Fit baffle ( ➔ [page 122](#) , Pos. 12).
  - Install oil filter holder, tighten bolts -arrows- uniformly to 15 Nm and torque a further + 90° (1/4 turn).
  - Install engine oil cooler with the bracket for the coolant pipes.
- The further installation is carried out in reverse order to removal.



## 2.6 Testing oil pressure and oil pressure switch - F1-



#### Note

1-pin and 2-pin oil pressure switches - F1- are installed. Before testing, check which oil pressure switch is installed.

### 2.6.1 Checking oil pressure and 1-pin oil pressure switch

#### Special tools and workshop equipment required

- ♦ Oil pressure tester , e.g. -V.A.G 1342-
- ♦ Voltage tester , e. g. -V.A.G 1527 B-
- ♦ Measuring tool set , e.g. -V.A.G 1594 C-
- ♦ Vehicle diagnosis, measurement and information system - VAS 5051B-

#### Conditions

- Engine oil level o.k., test ➔ Maintenance ; Booklet Octavia II
- Coolant temperature at least 80°C (radiator fan must have run at least once)



#### Note

Functional test and repair of the visual and acoustic oil pressure display ➔ Current flow diagrams, Electrical fault finding and Fitting locations, ➔ Vehicle diagnostic tester.

### Test sequence

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Remove oil pressure switch - F1- and screw into the tester.
- Screw the testing device into the oil filter holder instead of the oil pressure switch.
- Connect brown wire of tester to earth (-).
- Connect voltage tester - V.A.G 1527 B- to battery positive (+) and oil pressure switch using cables from auxiliary measuring set - V.A.G 1594 C- .

The LED must not light up.

- If the LED lights up, replace the oil pressure switch - F1- .

If the LED does not light up:

- Start engine and increase the engine speed.

Given an oil pressure of 0.12...0.16 MPa (1.2...1.6 bar) the LED must light up, otherwise replace the oil pressure switch.

- Increase engine speed further.

At 2000 rpm and an oil temperature of 80°C, the oil pressure should be 0.27-0.45 MPa (2.7-4.5 bar).

At a higher engine speed the oil pressure must not be greater than 0.7 MPa (7.0 bar).

If the measurement is less than the specification:

- Check the strainer in the oil suction pipe for contamination (⇒ [page 119](#) , Pos. 9).



### Note

*Mechanical damage such as bearing damage may also be the cause of oil pressure that is too low.*

If no fault is found:

- Replace balancing shaft module with oil pump ⇒ [page 127](#) .

If the specified pressure is exceeded:

- Inspect oil galleries.
- Replace the oil filter with the pressure relief valve as required.

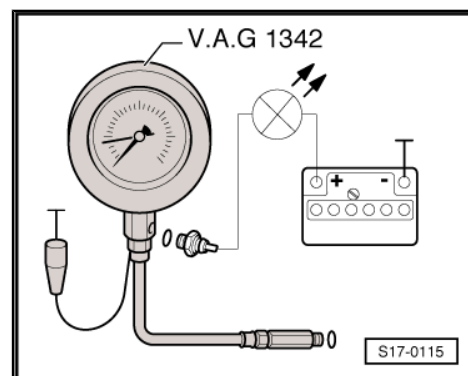
## 2.6.2 Checking oil pressure and 2-pin oil pressure switch

### Special tools and workshop equipment required

- ◆ Oil pressure tester , e.g. -V.A.G 1342-
- ◆ Test instrument adapter/DSO (2-pin) - VAS 5256-
- ◆ Hand multimeter , e.g. -V.A.G 1526 D-
- ◆ Vehicle diagnosis, measurement and information system - VAS 5051B-

### Conditions

- Engine oil level o.k., test ⇒ Maintenance ; Booklet Octavia II





- Coolant temperature at least 80°C (radiator fan must have run at least once)

**Note**

*Functional test and repair of the visual and acoustic oil pressure display ➔ Current flow diagrams, Electrical fault finding and Fitting locations, ➔ Vehicle diagnostic tester.*

**Test sequence**

- Remove the sound dampening system ➔ Body Work ➔ Rep. gr. 50 .
- Remove oil pressure switch - F1- and screw into the tester.
- Screw the testing device into the oil filter holder instead of the oil pressure switch.
- Screw the adapter - VAS 5256- onto the oil pressure switch.
- Connect the hand-held multimeter , e.g. -V.A.G 1526 D- , to the adapter - VAS 5256- and set up for the conductivity test:

The oil pressure switch must be open at a pressure below 0.12 MPa (1.2 bar).

- If the oil pressure switch is closed, replace it.

If the oil pressure switch is open:

- Start engine and increase the engine speed.

The oil pressure switch must closed at oil pressure of 0.12-0.16 MPa (1.2-1.6 bar), otherwise replace the oil pressure switch.

- Increase engine speed further.

At 2000 rpm and an oil temperature of 80°C, the oil pressure should be 0.27-0.45 MPa (2.7-4.5 bar).

At a higher engine speed the oil pressure must not be greater than 0.7 MPa (7.0 bar).

If the measurement is less than the specification:

- Check the strainer in the oil suction pipe for contamination ( ➔ [page 119](#) , Pos. 9).

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**Note**

*Mechanical damage such as bearing damage may also be the cause of oil pressure that is too low.*

If no fault is found:

- Replace balancing shaft module with oil pump ➔ [page 127](#) .

If the specified pressure is exceeded:

- Inspect oil galleries.
- Replace the oil filter with the pressure relief valve as required.

## 19 – Cooling

### 1 Parts of the cooling system - summary of components, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ



#### WARNING

*Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*



#### Note

- ◆ *When the engine is warm the cooling system is under pressure. If necessary reduce pressure before repairs.*
- ◆ *The hose connections are secured with spring-type clips. In case of repair, only use spring-type clips ⇒ Electronic Catalogue of Original Parts .*
- ◆ *Spring-type clip pliers are recommended for installation of spring-type clips.*
- ◆ *Always replace seals and gasket rings.*
- ◆ *When installing fit the coolant hoses free of stress, without them touching any other components (pay attention to the marking on the coolant connection).*
- ◆ *The arrows which are on the coolant pipes and the coolant hose ends must stand opposite to each other.*

#### 1.1 Parts of cooling system engine side - Summary of components

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1 - Spring strap clamp

2 - Connecting hose

3 - O-ring

□ replace

4 - Coolant temperature sender - G62-

5 - Retaining clip

6 - Coolant connection fitting

7 - to top of radiator/top of heat exchanger

□ Coolant hose schematic diagram ➔ [page 141](#) .

8 - 10 Nm

9 - Throttle valve module - J338-

□ Only for engine identification characters BLR, BLX, BLY, refrigerant-heated

□ Coolant hose schematic diagram ➔ [page 141](#) .

10 - 15 Nm

11 - Top coolant pipe

12 - Connecting hose

13 - to engine oil cooler

□ Coolant hose schematic diagram ➔ [page 141](#) .

14 - Coolant pipe below

□ removing and installing ➔ [page 161](#)

15 - 15 Nm

16 - to the expansion reservoir

□ Coolant hose schematic diagram ➔ [page 141](#) .

17 - 10 Nm

18 - to bottom radiator

□ Coolant hose schematic diagram ➔ [page 141](#) .

19 - 15 Nm

20 - Thermostat housing

□ removing and installing ➔ [page 156](#)

□ for engine identification characters BLR, BLX, BLY: unless authorised by ŠKODA AUTO A. S. ŠKODA AUTO A. S. does not guarantee or accept any liability in this document. Copyright by ŠKODA AUTO A. S.

♦ with map-controlled engine cooling thermostat - F265-

♦ Summary of components ➔ [page 143](#)

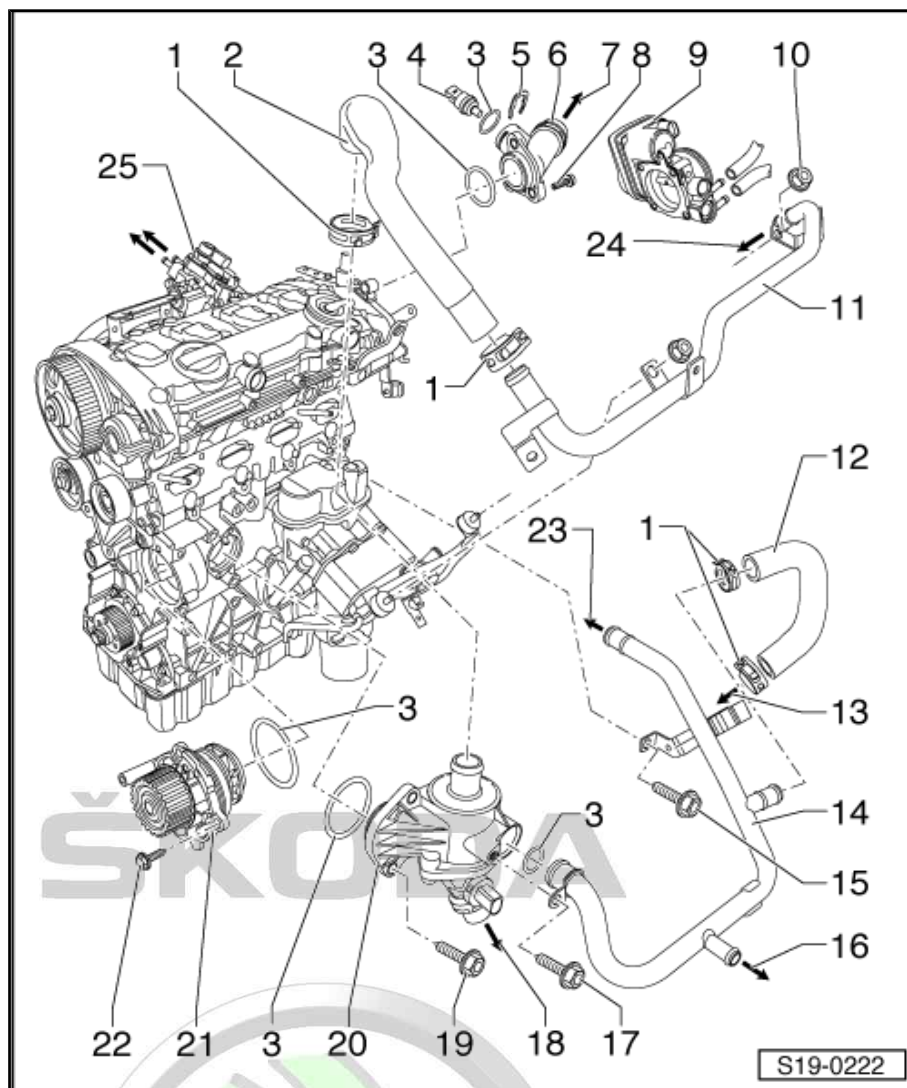
♦ removing and installing ➔ [page 153](#)

♦ check ➔ [page 155](#)

□ for engine identification characters BVX, BVY, BVZ

♦ with coolant regulator

♦ Test coolant regulator: Starts to open at 87 °C.



## 21 - Coolant pump

- ☐ removing and installing ➔ [page 153](#)

## 22 - 15 Nm

## 23 - to bottom of heat exchanger

- ☐ Coolant hose schematic diagram ➔ [page 141](#) .

## 24 - to coolant hose on top of radiator

- ☐ Coolant hose schematic diagram ➔ [page 141](#) .

## 25 - Exhaust gas return valve - N18-

- ☐ Only for engine identification characters BLR, BLX, BVX, BVY
- ☐ Coolant-heated
- ☐ Coolant hose schematic diagram ➔ [page 141](#) .

## 1.2 Parts of cooling system on the side next to the body - Summary of components

### 1 - Upper coolant hose

- ☐ To coolant connection fitting on cylinder head

### 2 - O-ring

- ☐ replace if damaged

### 3 - Radiator

- ☐ removing and installing ➔ [page 159](#)
- ☐ after replacing fill entire system with fresh coolant

### 4 - Gasket

### 5 - Screw cap

- ☐ Testing the pressure relief valve in the cap ➔ [page 163](#)

### 6 - Connector

### 7 - 2 Nm

### 8 - Expansion reservoir

- ☐ with coolant shortage warning light sender - G32-
- ☐ Check the cooling system for tightness ➔ [page 163](#)

### 9 - Support

- ☐ for radiator

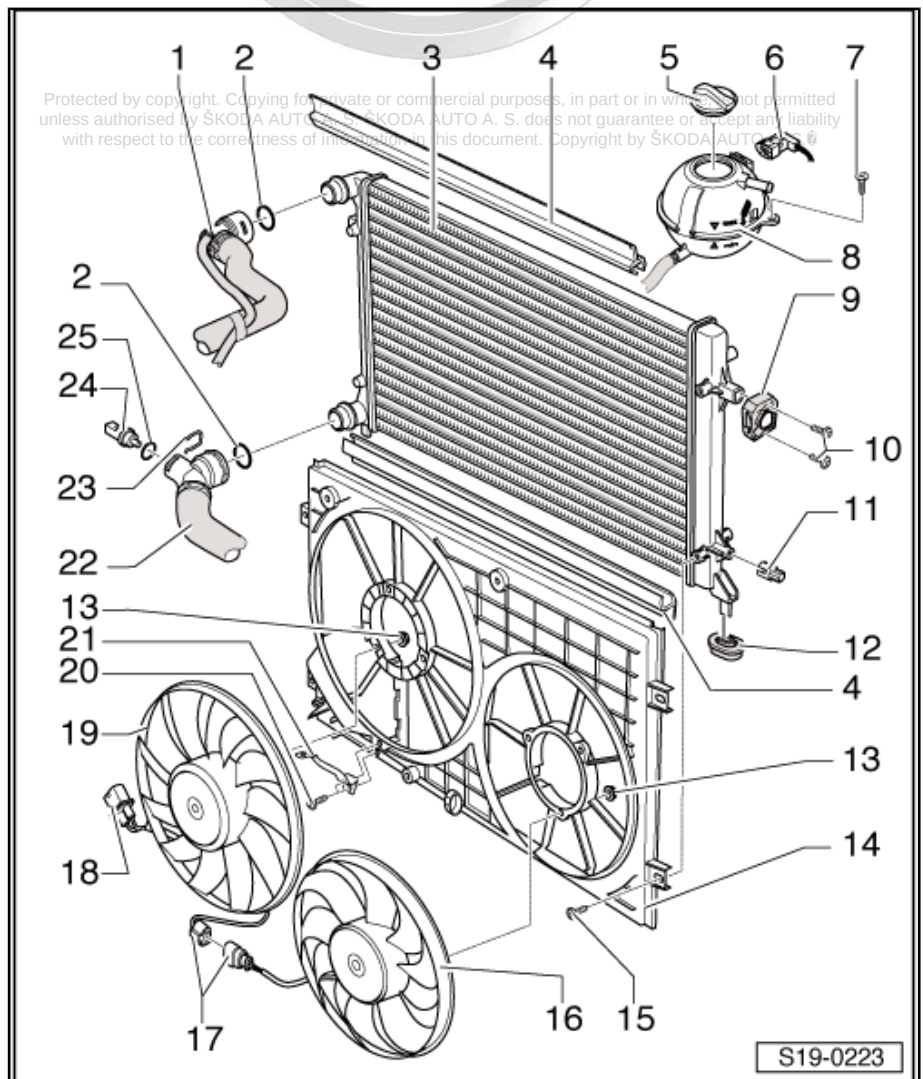
### 10 - 5 Nm

### 11 - Shim

- ☐ for bracket for coolant lines

### 12 - Rubber bearing

- ☐ 2 pieces
- ☐ insert into the lock carrier





**13 - 10 Nm**

**14 - Fan shroud**

- ☐ removing and installing ➔ [page 158](#)

**15 - 5 Nm**

**16 - Right radiator fan - V35-**

- ☐ removing and installing ➔ [page 158](#)

**17 - Connector**

**18 - Connector**

**19 - Radiator fan - V7-**

- ☐ removing and installing ➔ [page 158](#)
- ☐ with radiator fan control unit - J293-

**20 - 5 Nm**

**21 - Support**

- ☐ for intake air duct from lock carrier to container with pre-cubic contents

**22 - Bottom coolant hose**

- ☐ to the thermostat housing

**23 - Retaining clip**

**24 - Coolant temperature sender at radiator outlet - G83-**

**25 - O-ring**

- ☐ replace

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## 1.3 Coolant hose schematic diagram

Vehicles without auxiliary heating.

1 - Expansion reservoir

2 - Exhaust gas return valve - N18-

- ☐ Only for engine identification characters BLR, BLX, BVX, BVY

3 - Heat exchanger

4 - Gearbox oil cooler

- ☐ only on vehicles with automatic gearbox

5 - Engine oil cooler

6 - Throttle valve module - J338-

- ☐ Only for engine identification characters BLR, BLX, BLY, refrigerant-heated

7 - Intake manifold

8 - Radiator

9 - Thermostat housing

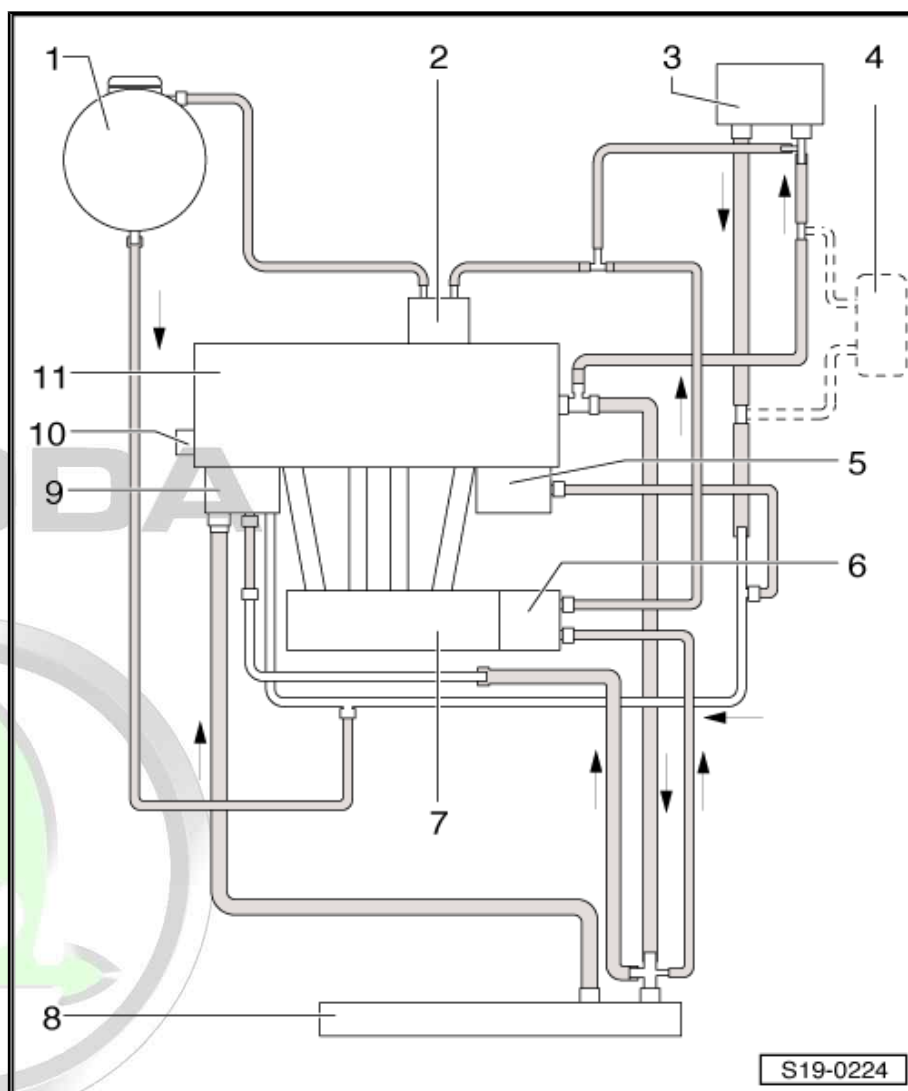
- ☐ Engine identification characters BLR, BLX, BLY: with map-controlled engine cooling thermostat - F265-  
⇒ [page 143](#)
- ☐ Engine identification characters BVX, BVY, BVZ: with coolant regulator

10 - Coolant pump

- ☐ removing and installing  
⇒ [page 153](#)

11 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing



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Vehicles with auxiliary heating.



**1 - Radiator**

**2 - Auxiliary heating**

**3 - Thermostat housing**

- ☐ Engine identification characters BLR, BLX, BLY: with map-controlled engine cooling thermostat - F265-  
⇒ [page 143](#)
- ☐ Engine identification characters BVX, BVY, BVZ: with coolant regulator

**4 - Coolant pump**

**5 - Cylinder head and cylinder block**

**6 - Expansion reservoir**

**7 - Exhaust gas return valve - N18-**

- ☐ Only for engine identification characters BLR, BLX, BVX, BVY

**8 - Non-return valve**

- ☐ integrated in the coolant hose
- ☐ not always visible from the outside

**9 - Heat exchanger**

**10 - Heater coolant shut-off valve - N279-**

**11 - Non-return valve**

- ☐ integrated in the coolant hose
- ☐ not always visible from the outside

**12 - Coolant hose**

- ☐ only on vehicles with automatic gearbox

**13 - Gearbox oil cooler**

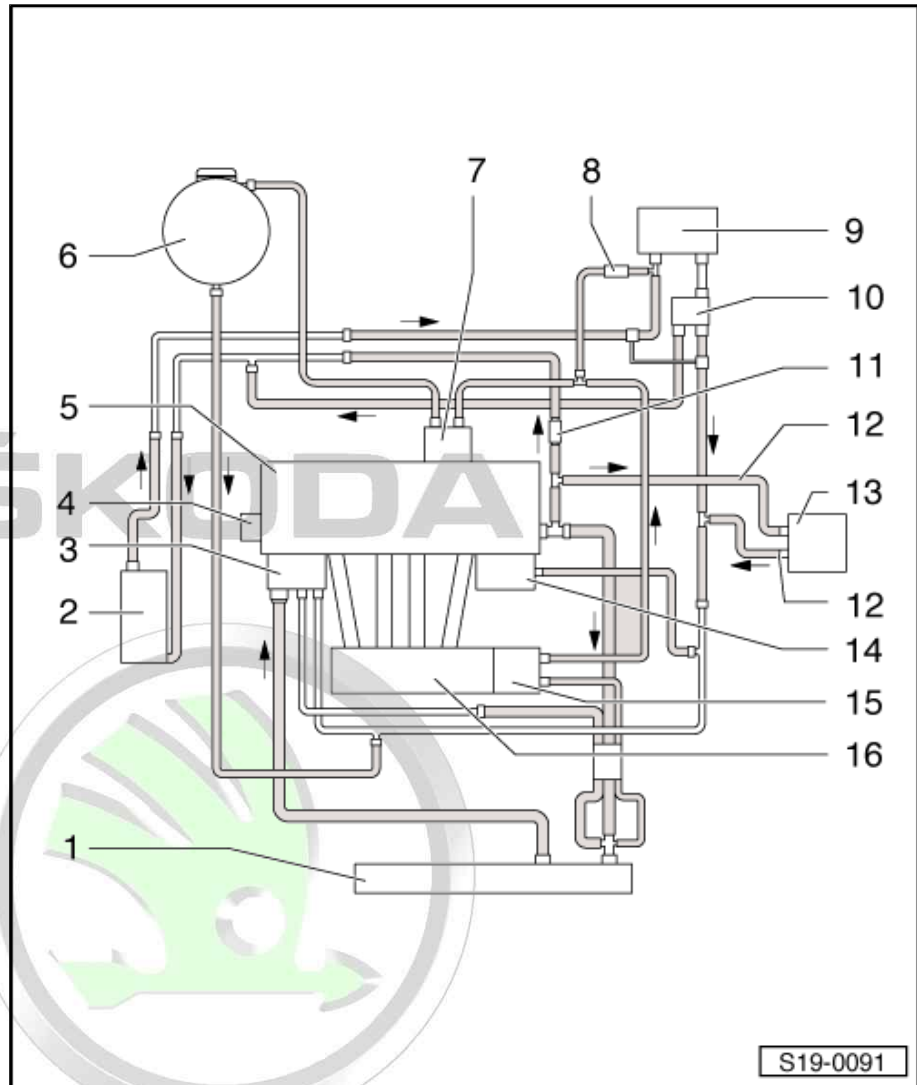
- ☐ only on vehicles with automatic gearbox

**14 - Engine oil cooler**

**15 - Throttle valve module - J338-**

- ☐ Only for engine identification characters BLR, BLX, BLY, refrigerant-heated

**16 - Intake manifold**



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## 1.4 Coolant regulator housing with coolant regulator, engine identification characters BLR, BLX, BLY

### 1 - O-ring

- ☐ replace

### 2 - Thermostat housing

- ☐ with map-controlled engine cooling thermostat - F265-
- ☐ removing and installing  
⇒ [page 156](#)

### 3 - O-ring

- ☐ replace

### 4 - Coolant pipe below

- ☐ removing and installing  
⇒ [page 161](#)

### 5 - 10 Nm

### 6 - 15 Nm

### 7 - Sealing ring

- ☐ replace

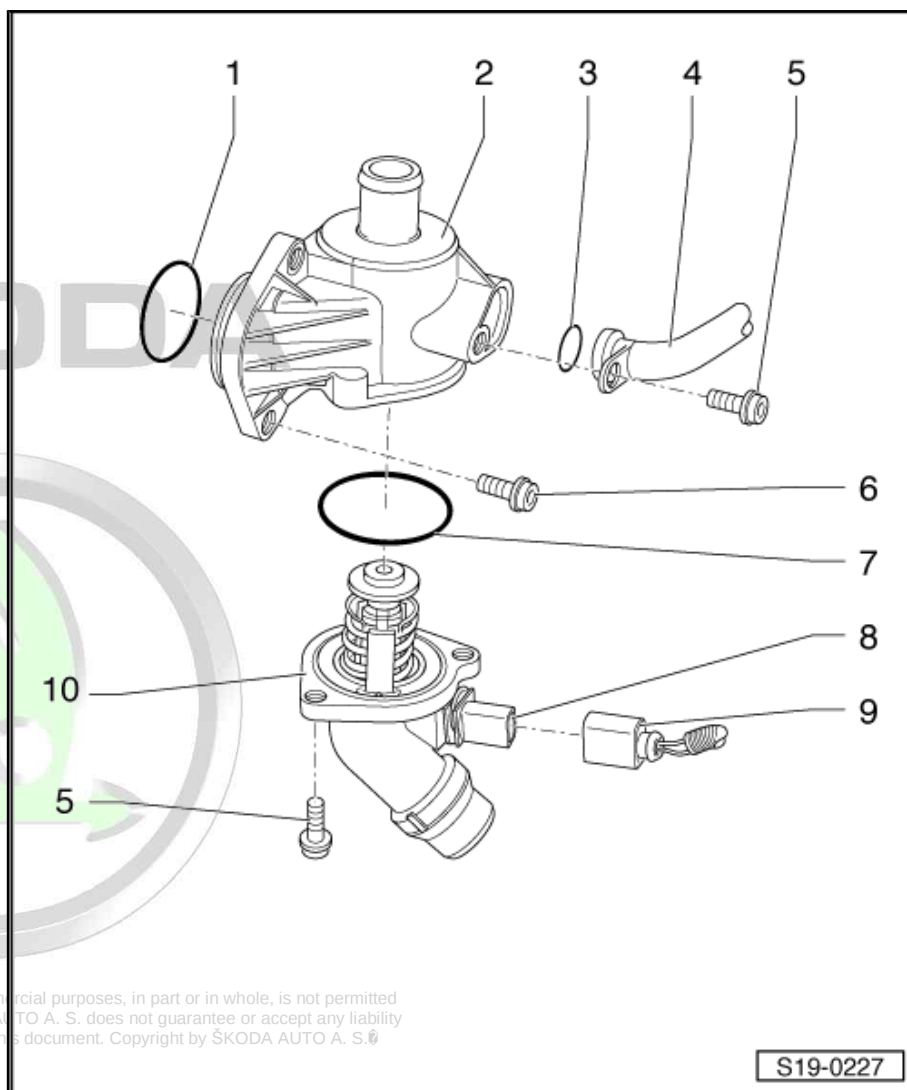
### 8 - Heating resistor

- ☐ Resistance at 25 °C:  
14...16 Ω

### 9 - Connector

### 10 - Map-controlled engine cooling thermostat - F265-

- ☐ removing and installing  
⇒ [page 153](#)
- ☐ check ⇒ [page 155](#)
- ☐ Start of opening approx.  
105 °C
- ☐ Opening stroke: 8 mm



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S19-0227



## 2 Parts of the cooling system - summary of components, engine identification characters BWA



### WARNING

*Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*



### Note

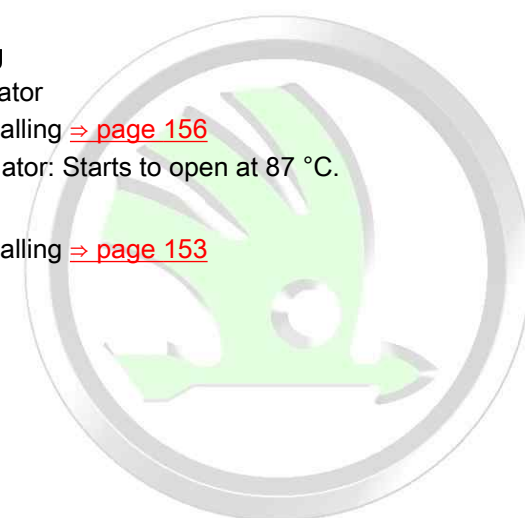
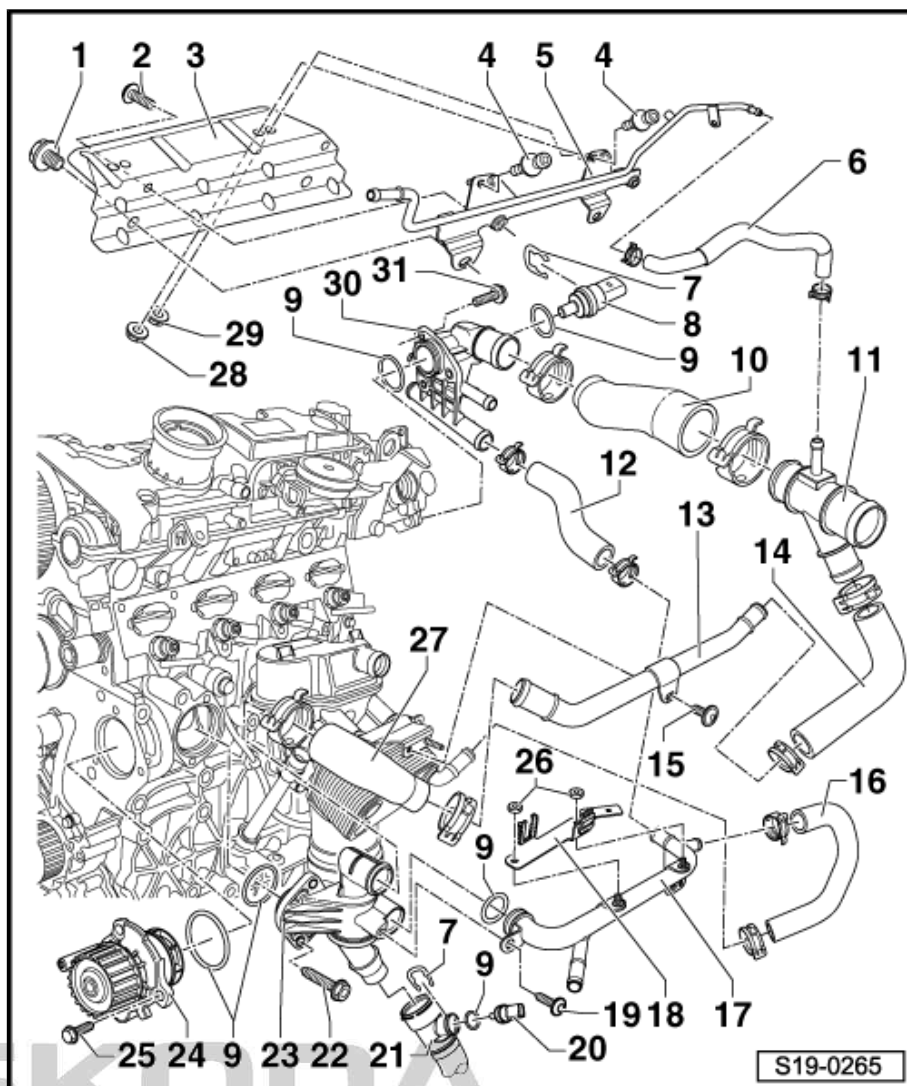
- ◆ *When the engine is warm the cooling system is under pressure. If necessary reduce pressure before repairs.*
- ◆ *The hose connections are secured with spring-type clips. In case of repair, only use spring-type clips ➔ Electronic Catalogue of Original Parts .*
- ◆ *Spring-type clip pliers are recommended for installation of spring-type clips.*
- ◆ *Always replace seals and gasket rings.*
- ◆ *When installing fit the coolant hoses free of stress, without them touching any other components (pay attention to the marking on the coolant connection).*
- ◆ *The arrows which are on the coolant pipes and the coolant hose ends must stand opposite to each other.*

### 2.1 Parts of cooling system engine side

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- 1 - 40 Nm
- 2 - 30 Nm
- 3 - Protection plate
- 4 - Ball head, 3.5 Nm
  - ☐ for engine cover
- 5 - Coolant pipe
- 6 - Connecting hose
- 7 - Retaining clip
- 8 - Coolant temperature sender - G62-
- 9 - O-ring
  - ☐ replace
- 10 - Connecting hose
- 11 - Connecting piece
- 12 - Connecting hose
- 13 - Coolant pipe
  - ☐ removing and installing  
⇒ [page 162](#)
- 14 - Connecting hose
- 15 - 5 Nm
- 16 - Connecting hose
- 17 - Coolant pipe
  - ☐ removing and installing  
⇒ [page 162](#)
- 18 - Support
- 19 - 5 Nm
- 20 - Coolant temperature sender at radiator outlet - G83-
- 21 - Connection fitting with connecting hose
- 22 - 15 Nm
- 23 - Thermostat housing
  - ☐ with coolant regulator
  - ☐ removing and installing ⇒ [page 156](#)
  - ☐ Test coolant regulator: Starts to open at 87 °C.
- 24 - Coolant pump
  - ☐ removing and installing ⇒ [page 153](#)
- 25 - 15 Nm
- 26 - 8 Nm
- 27 - Connecting hose
- 28 - 3.5 Nm
  - ☐ for ball head
- 29 - 6 Nm
  - ☐ for coolant pipe
- 30 - Coolant connection fitting
- 31 - 10 Nm





## 2.2 Parts of the cooling system fitted to body

### 1 - Upper coolant hose

- ☐ To coolant connection fitting on cylinder head
- ☐ Coolant hose schematic diagram ➔ [page 148](#) .

### 2 - O-ring

- ☐ replace if damaged

### 3 - Radiator

- ☐ removing and installing ➔ [page 160](#)
- ☐ after replacing fill entire system with fresh coolant

### 4 - Screw cap

- ☐ Testing the pressure relief valve in the cap ➔ [page 163](#)

### 5 - Connector

- ☐ with coolant shortage warning light sender - G32-

### 6 - 3 Nm

### 7 - Expansion reservoir

- ☐ with coolant shortage warning light sender - G32-
- ☐ Check the cooling system for tightness ➔ [page 163](#)

### 8 - 5 Nm

### 9 - 5 Nm

### 10 - Bottom coolant hose

- ☐ Coolant hose schematic diagram ➔ [page 148](#) .

### 11 - Right radiator fan - V35-

- ☐ removing and installing ➔ [page 158](#)

### 12 - Connector

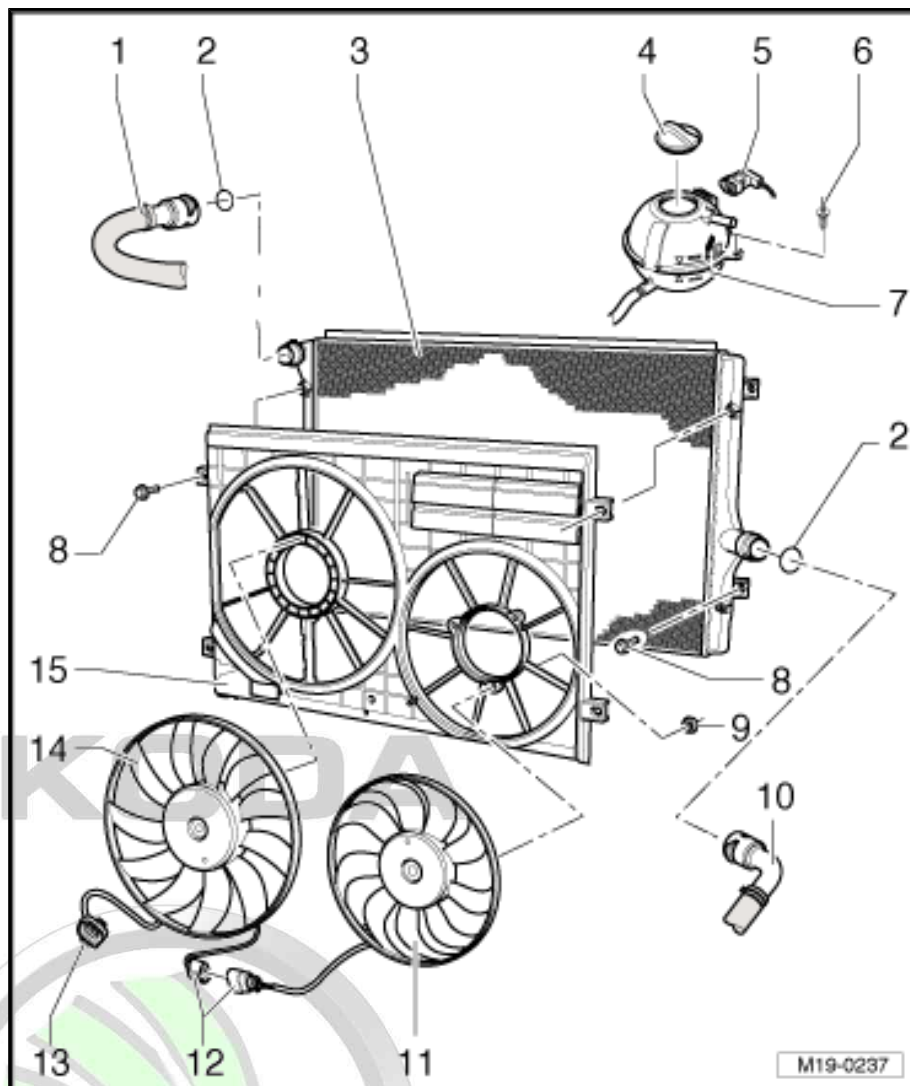
### 13 - Connector

### 14 - Radiator fan - V7-

- ☐ removing and installing ➔ [page 158](#)
- ☐ with radiator fan control unit - J293-

### 15 - Fan shroud

- ☐ removing and installing ➔ [page 158](#)



## 2.3 Coolant recirculation pump - V51- - Summary of components

1 - 5 Nm

2 - Coolant pipe

3 - Spring strap clamp

4 - Coolant line

☐ to exhaust gas turbo-charger

5 - Coolant hose

6 - Support

7 - 40 Nm

8 - Coolant hose

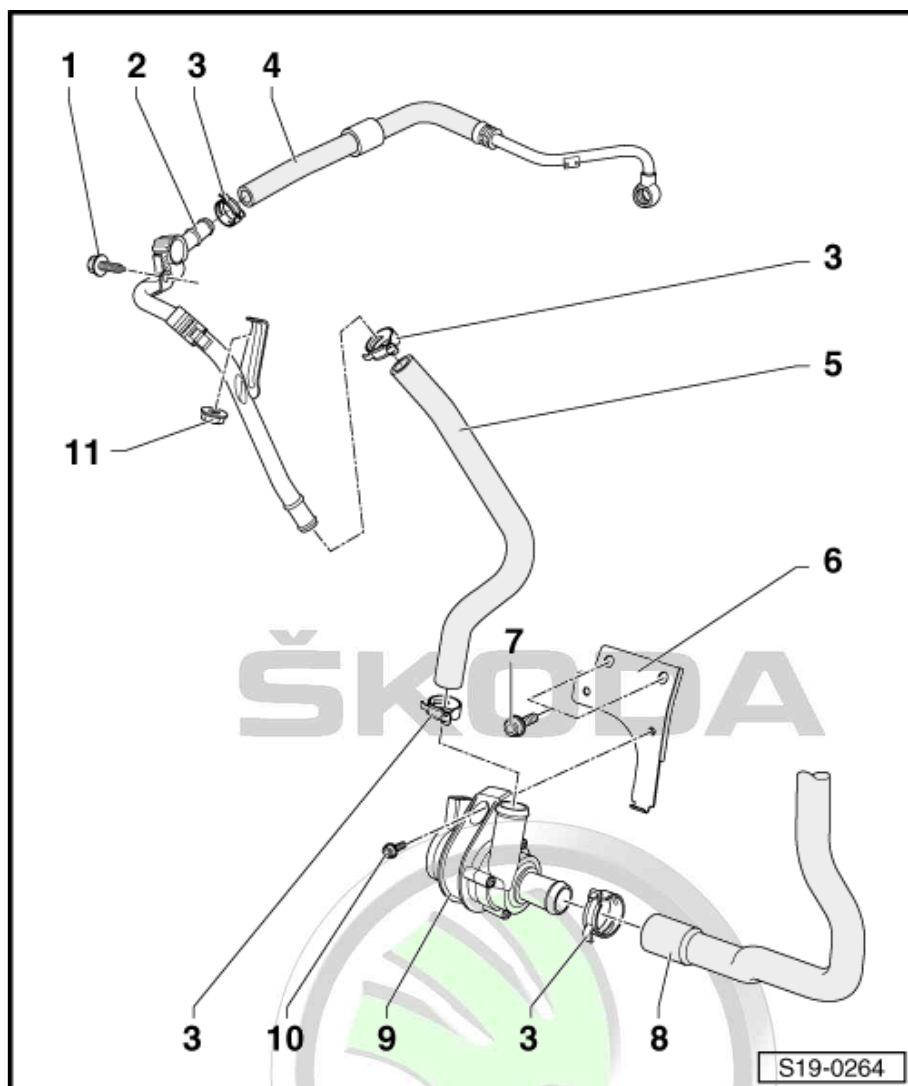
☐ to radiator inlet

9 - Coolant recirculation pump  
- V51-

☐ proper functioning can  
be tested using actuator  
diagnosis ⇒ Vehicle di-  
agnostic tester

10 - 8 Nm

11 - 5 Nm



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## 2.4 Coolant hose schematic diagram

### 1 - Radiator

- ☐ removing and installing  
⇒ [page 160](#)
- ☐ fill with fresh coolant after replacing

### 2 - Coolant recirculation pump - V51-

### 3 - Thermostat housing

- ☐ with coolant regulator

### 4 - Auxiliary heating

- ☐ only for vehicles with special equipment

### 5 - Coolant pump

- ☐ removing and installing  
⇒ [page 153](#)

### 6 - Cylinder head and cylinder block

- ☐ fill with fresh coolant after replacing

### 7 - Exhaust gas turbocharger

- ☐ removing and installing  
⇒ [page 201](#)

### 8 - Expansion reservoir

- ☐ with cap
- ☐ Testing the pressure relief valve in the cap  
⇒ [page 163](#)

### 9 - Heat exchanger for heater unit

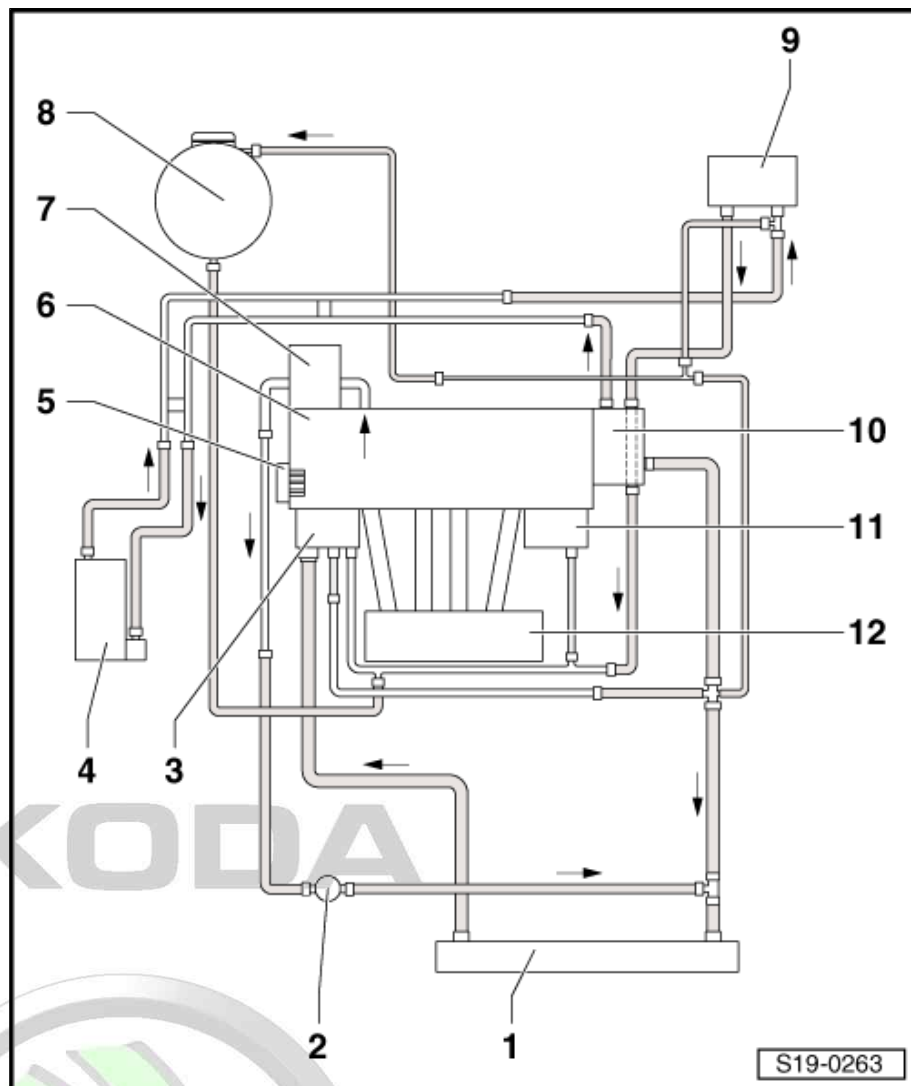
- ☐ fill with fresh coolant after replacing

### 10 - Coolant connection fitting

### 11 - Engine oil cooler

### 12 - Intake manifold

- ☐ removing and installing ⇒ [page 247](#)



## 3 Removing and installing parts of the cooling system - Part 1

### 3.1 Draining and filling up coolant

#### Special tools and workshop equipment required

- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Pliers for spring strap clamps
- ◆ Refractometer
- ◆ Protective goggles and gloves

#### Draining



#### Note

- ◆ *The drained coolant must not be re-used.*
- ◆ *Dispose of drained oil.*
- ◆ *Observe the disposal instructions.*



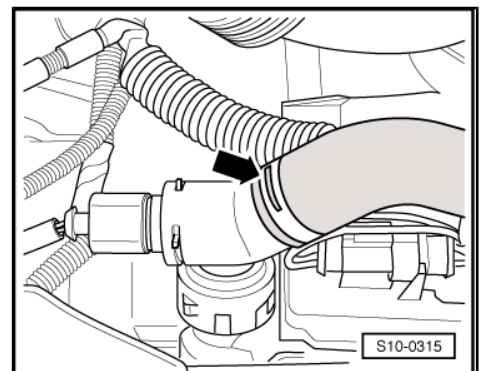
#### WARNING

***Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.***

- Open the screw cap of the expansion reservoir.
- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Place a catch pan under the radiator.

#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ

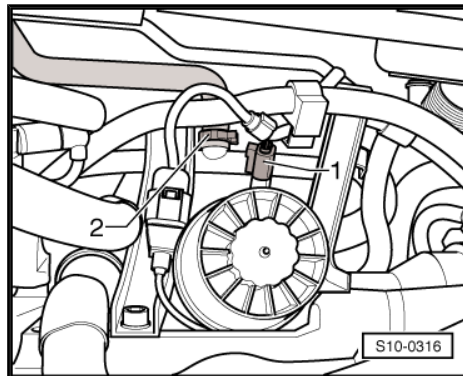
- To do so, open the spring-type clip -arrow- with spring-type clip pliers and slide back.
- Remove the coolant hose from the fitting.



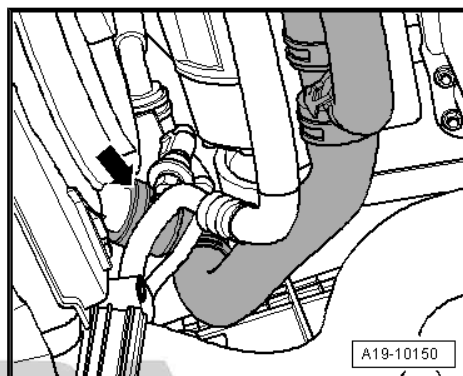


- Disconnect plug -1- at oil pressure switch - F1- .
- Remove the bottom coolant hose on the radiator -2- and drain residual coolant.

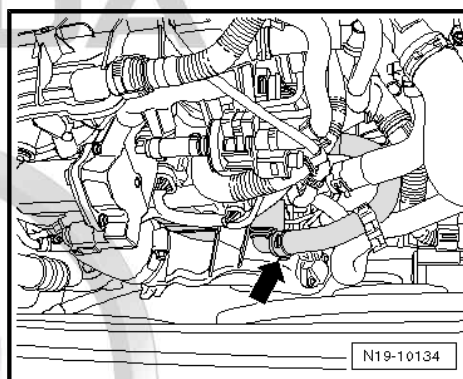
#### Vehicles with engine identification characters BWA



- Release quick coupler -arrow- and disconnect the coolant hose from the radiator.



- Open spring-type clip -arrow- and pull the coolant hose off the engine oil cooler.



#### Filling up



#### Note

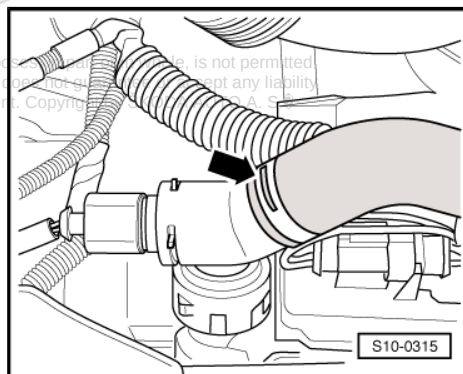
- ♦ *The drained coolant must not be re-used.*
- ♦ *The cooling system is filled all year round with a mixture of distilled water and coolant additive with anti-corrosion agent.*

Select the appropriate coolant additive from the ➔ Electronic Catalogue of Original Parts or from the list of allowed coolant additives ➔ Maintenance ; Booklet Octavia II .

- In a clean reservoir, mix distilled water and coolant additive in the specified mixing ratio ➔ Maintenance ; Booklet Octavia II .

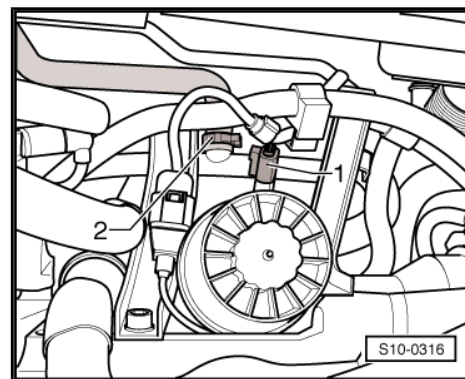
#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

- Place the coolant hose onto the radiator neck and secure it with the spring strap clip -arrow-.

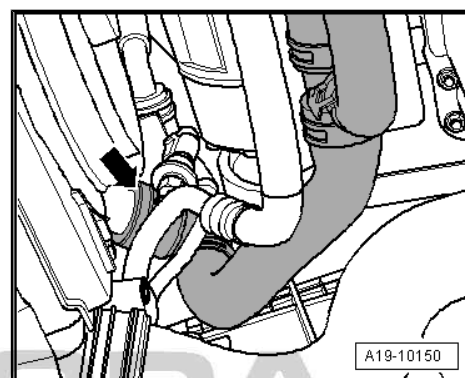


- Fit bottom coolant hose to coolant pipe -2-.
- Connect plug -1- to the oil pressure switch - F1- .

**Vehicles with engine identification characters BWA**



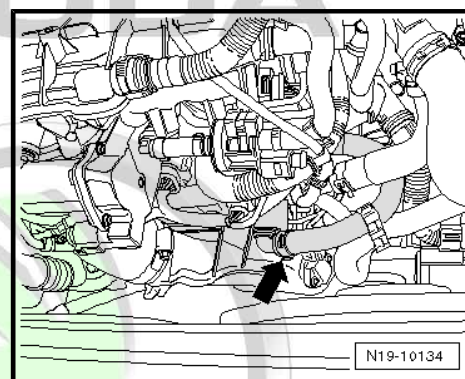
- Connect quick coupler -arrow- to the radiator neck.



- Connect coolant hose to the engine oil cooler and secure with spring-type clip -arrow-.

**Continued for all vehicles**

- Install the noise insulation ⇒ Body Work; Rep. gr. 50 .



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- Fill coolant slowly up to the top marking of the criss-crossed field (max.) on the expansion reservoir.
- Fit expansion tank cap.
- Switch off the heater unit and air conditioning unit.

#### Vehicles with heater coolant shut-off valve - N279-

##### I. Vehicles without auxiliary heating



#### Note

*This also applies to vehicles with auxiliary heating that do not have a heater coolant shut-off valve - N279- .*

- Start the engine and maintain the engine speed for about 3 minutes at approx. 2000 r.p.m.
- Run engine until radiator fan - V7- starts.

##### II. Vehicles with auxiliary heating.



#### Caution

*The auxiliary heating must only be switched on, if the refrigerant circuit is filled up -as described below-.*

- Connect vehicle diagnosis, measurement and information system - VAS 5051B- .
- Start the engine and maintain the engine speed for about 3 minutes at approx. 2000 r.p.m.
- On the display press consecutively the buttons for “Vehicle self-diagnosis”, “18 - Auxiliary heating” and “03 - Actuator diagnosis”.
- Press the right arrow on the display so often until the coolant shut-off valve of heating system - N279- is shown.
- Perform self-diagnosis for the coolant shut-off valve of heating system - N279- and maintain the engine speed at approx. 2000 rpm for about 1 minute.
- Run engine until radiator fan - V7- starts.

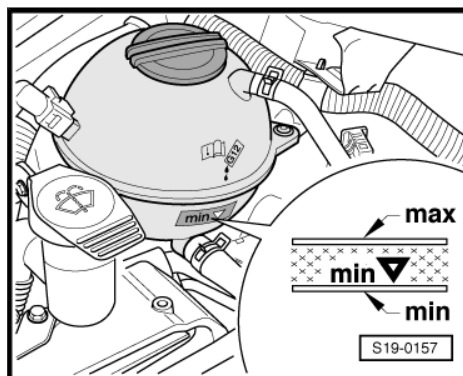
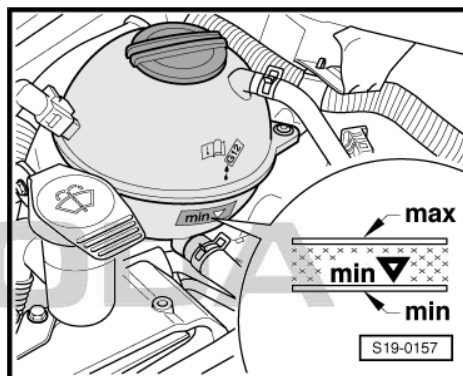
#### Continued for all vehicles

- Check coolant level when the expansion reservoir is closed.
- When engine is at operating temperature the coolant level must be at the maximum marking, when engine is cold between the minimum and the maximum markings.



#### WARNING

*Hot steam may escape when the compensation bottle is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*



- If necessary, top up with coolant.



## 3.2 Removing and installing coolant pump

### Removing



#### WARNING

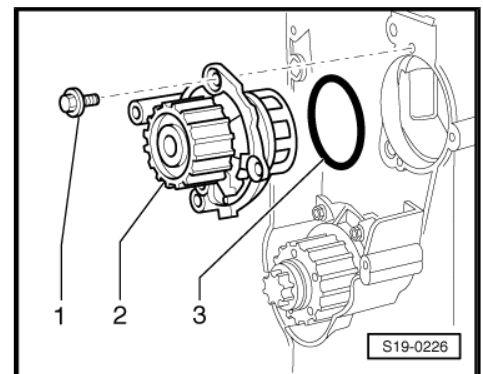
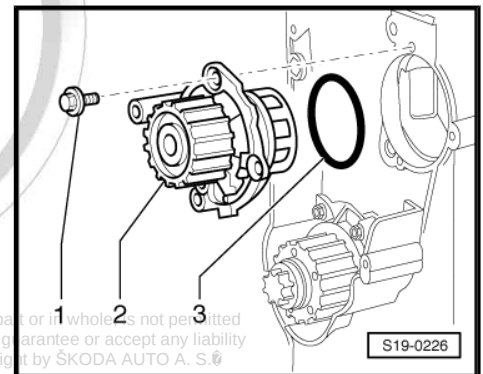
*Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*

- Drain coolant ➔ [page 149](#) .
- Removing the toothed belt:
- ◆ Engines without split toothed belt guard ➔ [page 40](#) .
- ◆ Engines with split toothed belt guard ➔ [page 50](#) .
- Unscrew securing bolts -1- of the coolant pump and remove the coolant pump -2-.
- Remove O-ring -3-.

### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace O-ring.
- Clean and smooth O-ring sealing surfaces.
- Moisten the new O-ring -3- with coolant.
- Attach the coolant pump -2-.
- Fitting position: Plug in the housing is pointing downwards.
- Tighten screws -1- of coolant pump to 15 Nm.
- Installing the timing belt:
- ◆ Engines without split toothed belt guard ➔ [page 40](#) .
- ◆ Engines with split toothed belt guard ➔ [page 50](#) .
- Top up coolant ➔ [page 149](#) .



## 3.3 Removing and installing map-controlled engine cooling thermostat - F265- , engine identification characters BLR, BLX, BLY

### Removing



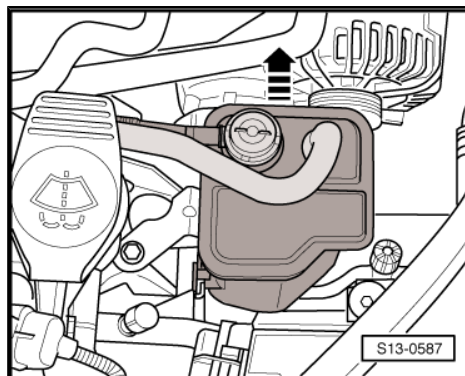
#### Note

*If the map-controlled engine cooling thermostat - F265- needs to be removed with the coolant regulator housing, the coolant pipe must be removed first ➔ [page 161](#) .*

- Disconnect the battery-earth strap with the ignition off and electrical consumers switched off ➔ Electrical System; Rep. gr. 27 .



- Remove engine cover.
- Drain coolant ➔ [page 149](#) .
- Pull activated charcoal filter with its attached lines upwards in -direction of arrow- out of the mounting and place to the side.
- Remove the generator ➔ Electrical System; Rep. gr. 27 .



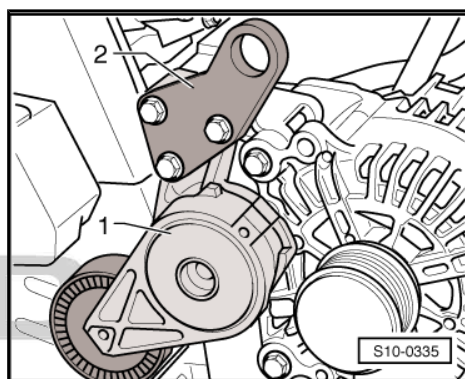
- Remove V-ribbed belt tensioning device -1- with the lifting eye -2-.

#### Vehicles with air conditioning



#### WARNING

*Do not open the refrigerant circuit of the air conditioning system.*



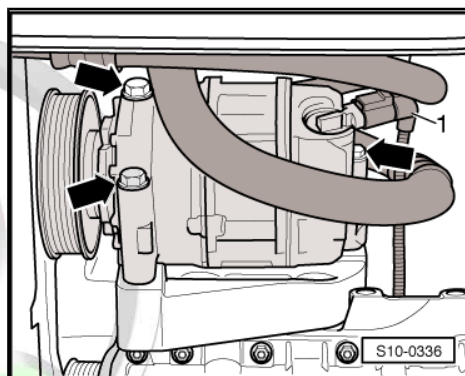
- Disconnect the plug -1- for the magnetic coupling on the AC compressor.



#### Note

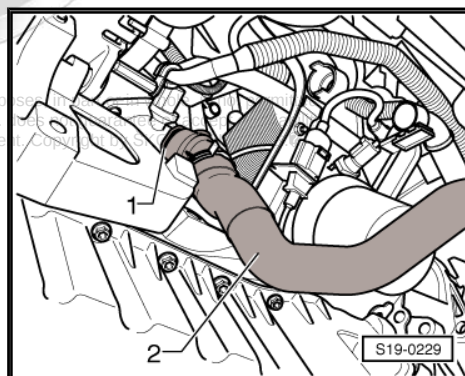
*In order to avoid damage to the AC compressor as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.*

- Release screws -arrows- for AC compressor.
- Tie AC compressor to the bottom of the lock carrier with connected refrigerant hoses.



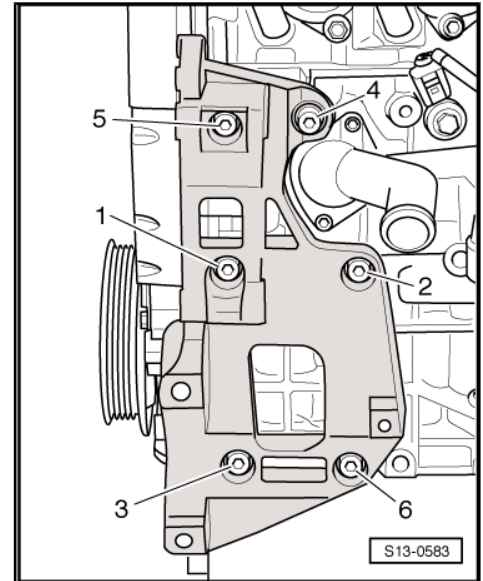
#### Continued for all vehicles

- Remove coolant hoses -2-. To do so, remove retaining clips -1-.



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- Unscrew bolts -1- to -6- and remove bracket for auxiliary units.

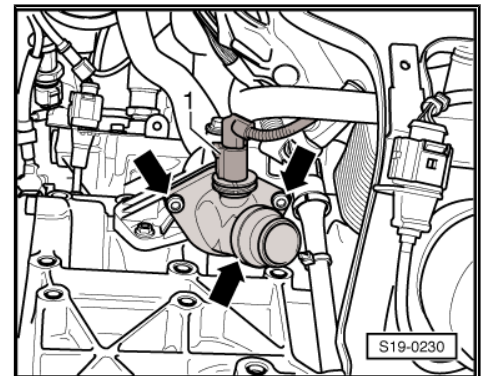


- Disconnect plug connection -1-.
- Remove map-controlled engine cooling thermostat - F265-  
-arrows-.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace O-ring.
- Clean sealing surface for O-ring or smoothen.
- Moisten new O-ring with coolant.
- Install the bracket for auxiliary units ⇒ [page 33](#) .
- Top up coolant ⇒ [page 149](#) .
- Install generator ⇒ Electrical System; Rep. gr. 27 .
- Install AC compressor ⇒ Heating, Air Conditioning; Rep. gr. 87 .
- Install the V-ribbed belt ⇒ [page 39](#) .
- Carry out cohesive work when reconnecting the battery ⇒ Electrical System; Rep. gr. 27 .



### 3.4 Testing the map-controlled engine cooling thermostat - F265- , engine identification characters BLR, BLX, BLY

#### Special tools and workshop equipment required

- ◆ Measuring tool set , e.g. -V.A.G 1594 C-

#### Test sequence

- Remove map-controlled engine cooling thermostat - F265-  
⇒ [page 153](#) .



- Check the thermostat when it is cold.

The large valve head -arrow- must seal against the connecting flange around its entire circumference.

If the seal is not OK:

- Replace the map-controlled engine cooling thermostat - F265- .

If the seal is OK:

- Connect contacts of map-controlled engine cooling thermostat - F265- to the battery with auxiliary lines from the auxiliary measuring set - V.A.G 1594 C- . Use pliers to place the thermostat carefully in a pan with boiling coolant up to the flange and upright (mixing ratio: 50% G12).



#### WARNING

**Do not touch the metal parts of the thermostat, as they heat up. Risk of scalding!**

The resistance heating now also heats the wax in the thermostat.

- Check whether the minimum distance -a- of 8 mm is reached after 10 minutes.

If the distance of 8 mm is reached:

- Disconnect power supply to the battery.



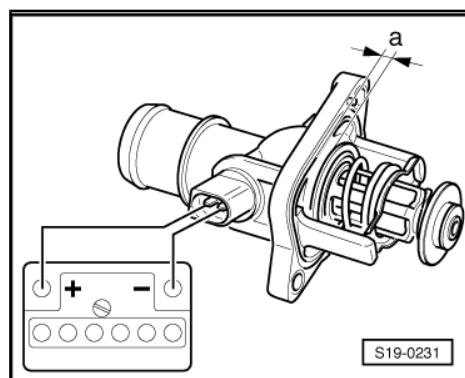
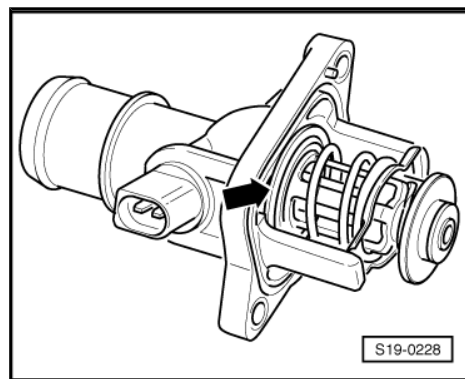
#### Note

**This test must not be performed in air. If it is, the wax element may be damaged!**

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If the minimum distance is not reached:

- Replace the map-controlled engine cooling thermostat - F265- .



## 3.5 Removing and installing coolant regulator housing

### Removing

- Remove alternator ➔ Electrical System ➔ Rep. gr. 27 .

**Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ**

- Remove coolant pipe ➔ [page 161](#) .

**Vehicles with engine identification characters BWA**

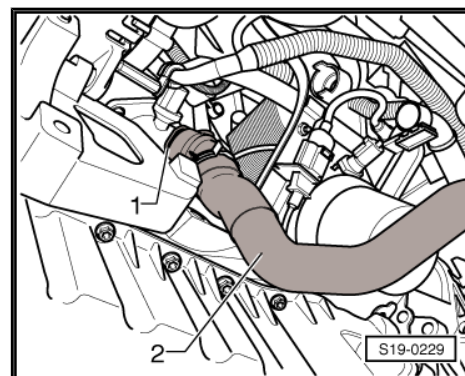
- Remove coolant pipes ➔ [page 162](#) .



### Continued for all vehicles

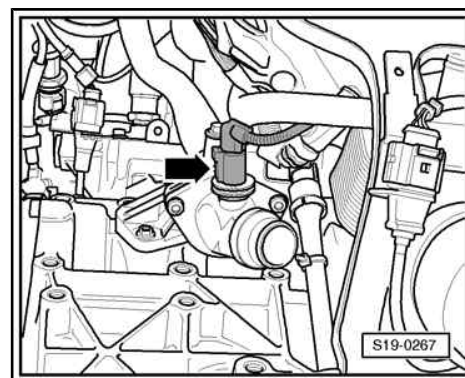
- Detach coolant hose -2- from the coolant regulator housing.  
To do so, remove retaining clips -1-.

### Vehicles with engine identification characters BLR, BLX, BLY



- Disconnect plug -arrow- from the map-controlled engine cooling thermostat - F265- .

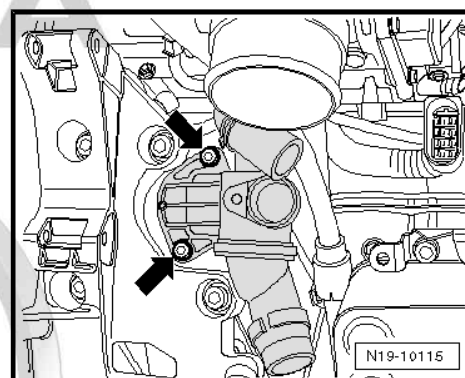
### Continued for all vehicles



- Unscrew bolts -arrows- and remove coolant regulator housing.

### Install

- Clean sealing surface for O-ring.
- Replace O-ring and moisten with coolant.
- Position the coolant regulator housing on the cylinder block and tighten the bolts to 15 Nm.
- The further installation is carried out in reverse order to removal.



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## 4 Removing and installing parts of the cooling system - Part 2

### 4.1 Removing and installing fan shroud for radiator fan - V7- and right radiator fan - V35-

#### Special tools and workshop equipment required

- ◆ Hose clamps - T30096 (3093)-
- ◆ Catch pan , e.g. -VAS 6208- , only engine identification characters BWA
- ◆ Pliers for spring strap clamps

#### Removing

- Remove the sound dampening system ➔ Body Work; Rep. gr. 50 .

#### Vehicles with engine identification characters BWA

- Remove engine cover ➔ [page 242](#) .
- Unscrew the bolts -arrows- and remove the intake air neck -2-.
- Clamp off the coolant supply hose with the hose clamp - T30096- .
- Place the catch pan underneath and release the quick coupler -1-.



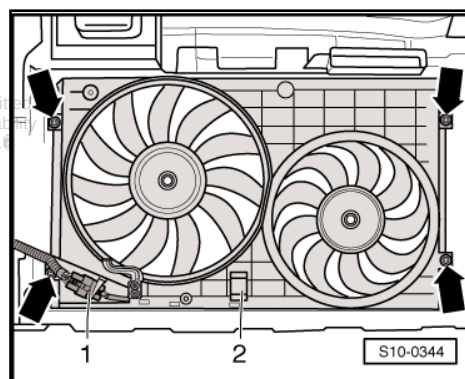
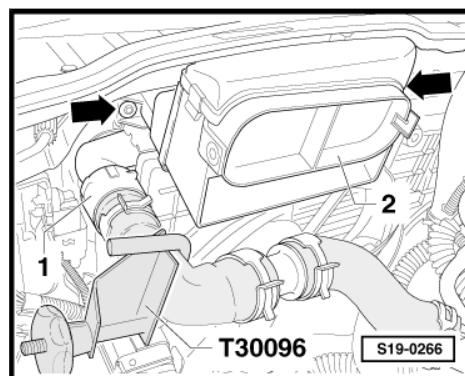
#### Note

*If service position is required for further work, the quick coupler of the coolant supply hose must not be released.*

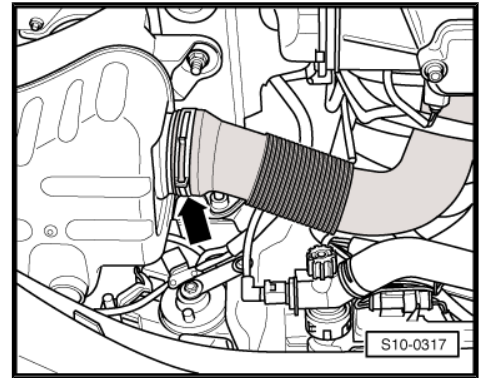
#### Continued for all vehicles

- Unscrew the top securing bolts -arrows above- of the fan shroud.

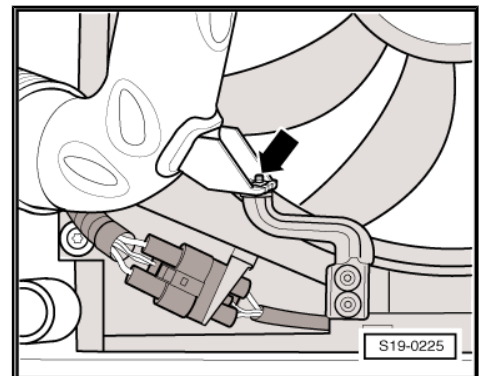
#### Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ



- Detach bottom air guide hose from container with pre-cubic contents. To do so, open the spring-type clip -arrow- and push it back.



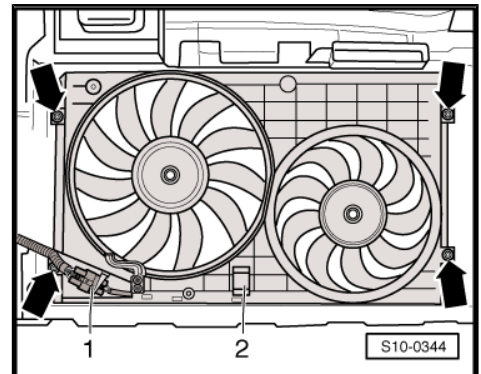
- Detach and remove the air guide hose from the bracket -arrow-.



- Unhook the bottom coolant hose (not shown in the fig.) from the bracket -2-.

#### Continued for all vehicles

- Separate electrical plug connection -1-.
- Unscrew the bottom securing bolts -arrows below- of the fan shroud.
- Remove the fan shroud.
- ♦ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ: to bottom
- ♦ Engine identification characters BWA: to top



#### Install

Installation occurs in reverse order to removal.

## 4.2 Removing and installing radiator, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### Special tools and workshop equipment required

- ♦ Catch pan , e.g. -VAS 6208-
- ♦ Pliers for spring strap clamps

#### Removing

- Drain coolant ➔ [page 149](#) .



- Release and pull off connector -1-.
- Remove coolant connector from top and bottom of radiator.
- Remove fan shroud with radiator fans ➔ [page 158](#) .

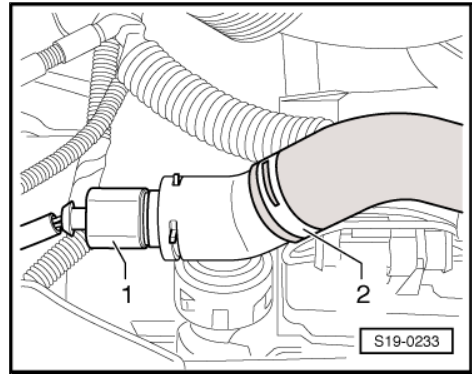
#### Vehicles with air conditioning

- Put lock carrier in service position ➔ Body Work; Rep. gr. 50 .
- Unscrew bolts ( ➔ [page 139](#) , Pos. 10) of radiator mounting on right and left of the lock carrier.



#### WARNING

*Do not open the refrigerant circuit of the air conditioning system.*



#### Caution

*In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.*



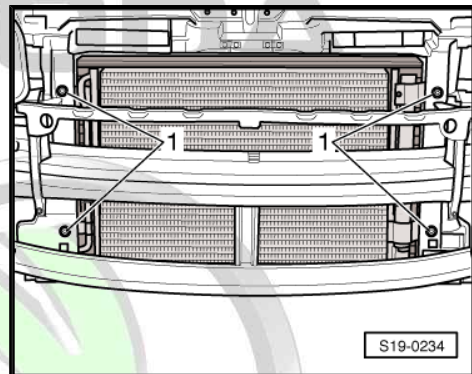
#### Note

*For the following work, a second mechanic is required to hold the radiator.*

- Unhook the radiator upwards out of the bottom mountings and swivel to the rear.
- Screw out the fixing screws -1- of the condenser.
- Remove cooler downwards.

#### Vehicles without air conditioning system

- Unscrew bolts ( ➔ [page 139](#) , Pos. 10) of radiator mounting on right and left of the lock carrier.
- Push radiator downwards out of the rubber mounts.
- Swivel the radiator down slightly to the rear and remove downwards.



#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- If a cooler is assembled, the old (drained) coolant may not be used.
- Top up coolant ➔ [page 149](#) .

## 4.3 Removing and installing radiator, engine identification characters BWA

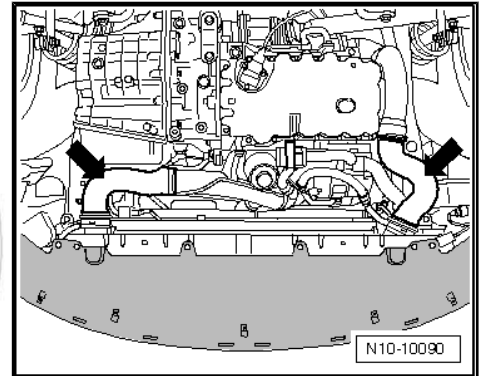
#### Special tools and workshop equipment required

- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Pliers for spring strap clamps

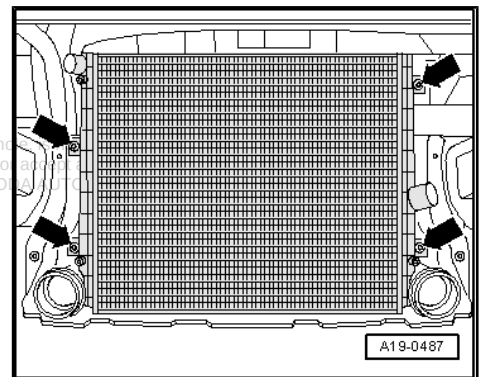
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## Removing

- Drain coolant ➔ [page 149](#) .
- Put lock carrier in service position ➔ Body Work; Rep. gr. 50 .
- Remove the coolant hoses from the radiator.
- Detach air guide hoses -arrows- from charge air cooler.
- Remove fan shroud with radiator fans ➔ [page 158](#) .



- Unscrew bolts -arrows- from the radiator.
- Lift the radiator out of the mounting in the charge air cooler and pull backwards slightly.
- Remove radiator downwards.



## Install

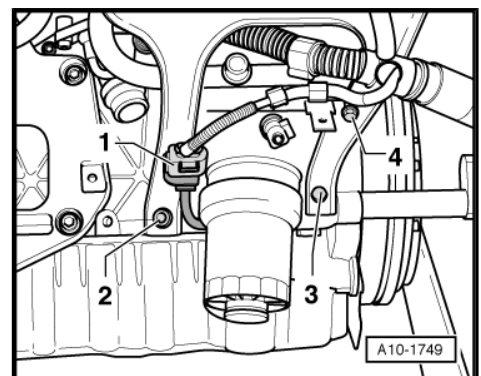
Installation is carried out in the reverse sequence. Pay attention to the following:

- If a cooler is assembled, the old (drained) coolant may not be used.
- Top up coolant ➔ [page 149](#) .

## 4.4 Removing and installing bottom coolant pipe, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

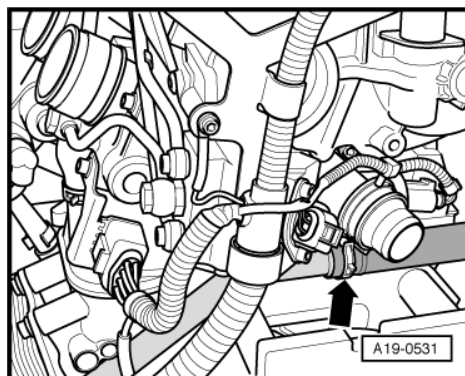
### Removing

- Drain coolant ➔ [page 149](#) .
- Removing the intake manifold ➔ [page 243](#) .
- Pull plug -1- out of the mounting and move the cable clear.
- Detach all electrical cables from the intake manifold support.
- Remove bolts -2- to -4- and remove intake manifold support.





- Detach coolant hose -arrows- from the coolant pipe.
- Detach coolant hose to the expansion reservoir from the coolant pipe.

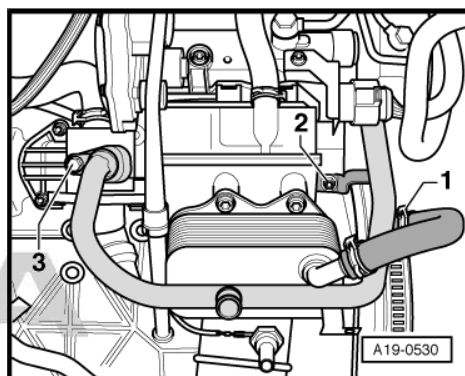


- Detach coolant hose -1- from coolant pipe.
- Unscrew bolts -2- and -3- and remove the coolant pipe.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace O-ring for the pipe in the coolant regulator housing.
- Top up coolant ⇒ [page 149](#) .



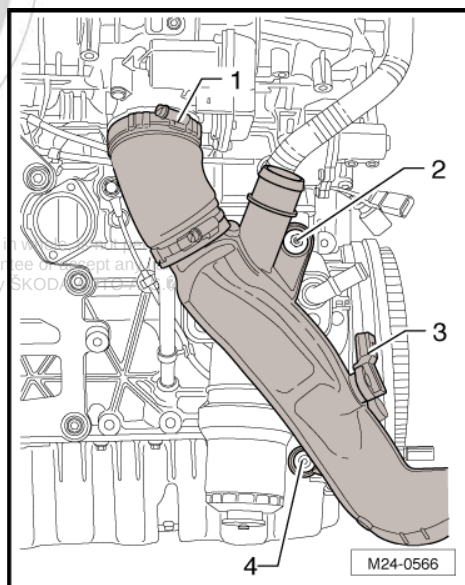
## 4.5 Removing and installing coolant pipes, engine identification characters BWA

### Special tools and workshop equipment required

- ♦ Pliers for spring strap clamps

### Removing

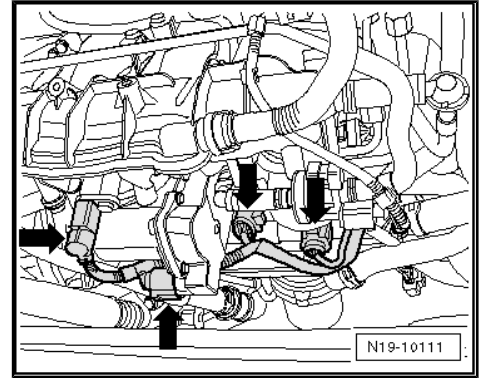
- Remove engine cover ⇒ [page 242](#) .
- Remove fan shroud with radiator fans ⇒ [page 158](#) .
- Disconnect plug from charge pressure sender - G31- -3-.
- Unscrew screws -2- and -4-.
- Release clamp -1-, disconnect the quick coupler from the charge air cooler and remove the charge air pipe with the hose downwards.
- Drain coolant ⇒ [page 149](#) .



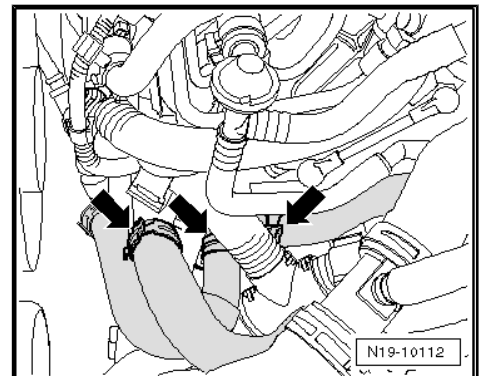
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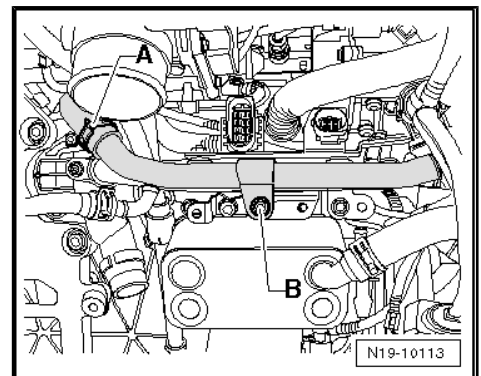
- Disconnect the electrical plug connections -arrows-.



- Detach the coolant hoses from the coolant pipes -arrows-.



- Disconnect hose -A- and unscrew bolt -B-. Remove the front coolant pipe.

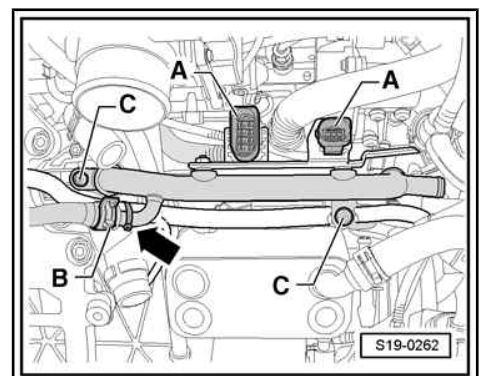


- Pull plug -A- out of the mounting.
- Open spring-type clip -B- and disconnect the coolant hose.
- Split the cable straps -arrow-.
- Unscrew bolts -C-. Remove the rear coolant pipe.

#### Install

Installation is carried out in the reverse sequence.

- Tighten the bolts of the coolant pipes to 5 Nm.
- Top up coolant ➔ [page 149](#) .



## 4.6 Checking the coolant system for leak-tightness

### Special tools and workshop equipment required

- ◆ Cooling system testing device , e.g. -V.A.G 1274-
- ◆ Adapter , e.g. -V.A.G 1274/8-
- ◆ Adapter , e.g. -V.A.G 1274/9-



### Test condition

- Engine must be warm.

### Test sequence



#### WARNING

*Hot steam may escape when the coolant expansion reservoir is opened. Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding. Cover the cap with a cloth and open carefully.*

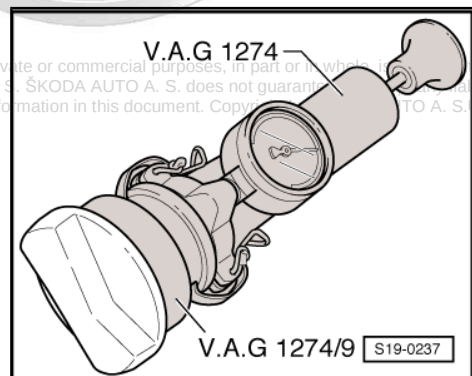
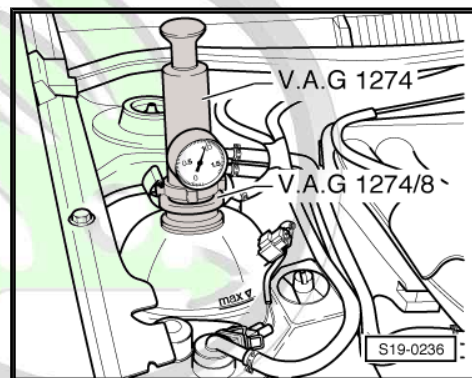
- Open the screw cap of the expansion reservoir.
- Position the cooling system testing device - V.A.G 1274- with adapter - V.A.G 1274/8- on the coolant expansion reservoir.
- Using the hand pump of the testing device generate a pressure of approx. 0.1 MPa (1.0 bar).

If the pressure drops:

- Search position of the leak and repair fault.

### Testing the pressure relief valve in the cap

- Position the cooling system testing device - V.A.G 1274- with adapter - V.A.G 1274/9- on the cap.
- Operate the handpump.
- The pressure relief valve must open at a pressure of 0.14-0.16 MPa (1.4-1.6 bar).



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## 20 – Fuel supply system

### 1 Fuel tank and fuel delivery unit

#### Note

- ◆ *Fuel hoses at the engine must only be secured with spring-type clips ⇒ electronic catalogue of original parts .*
- ◆ *Spring-type clip pliers are recommended for installation of spring-type clips.*

#### 1.1 Fuel containers for vehicles with front-wheel drive - Summary of components

##### 1 - Mounting part

##### 2 - Screw cap

- ☐ replace if damaged

##### 3 - Earth connection

- ☐ check for firm seating

##### 4 - 11 Nm

##### 5 - Cable guide

##### 6 - 25 Nm

- ☐ replace

##### 7 - Fuel tank

- ☐ removing and installing  
⇒ [page 171](#)

##### 8 - Circlip

##### 9 - Unbolt bracket for exhaust pipe

##### 10 - Tensioning strap

- ☐ Check installation position

##### 11 - Protection plate

##### 12 - Feed line

- ☐ to high pressure pump
- ☐ check for firm seating

##### 13 - Fuel filter

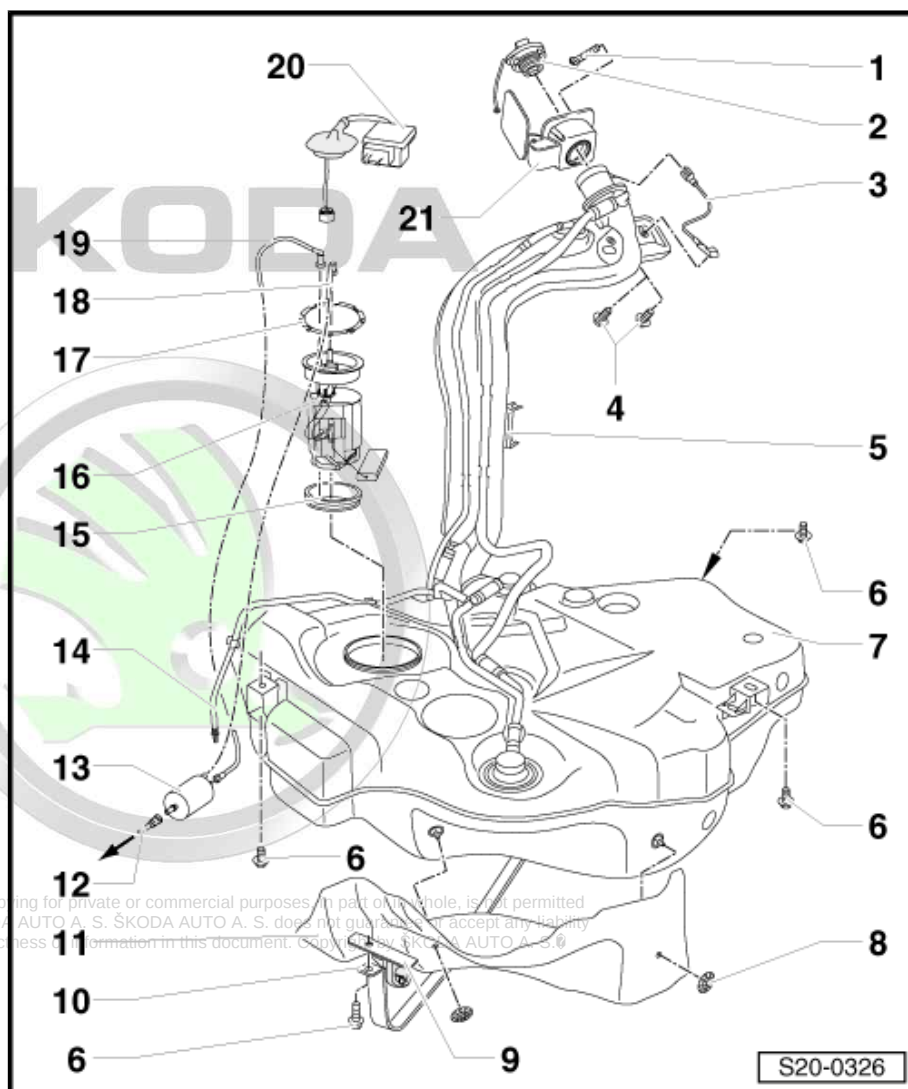
- ☐ Fitting position: arrow points in direction of flow

##### 14 - Vent line

- ☐ clipped in place on the side of the fuel tank
- ☐ check for firm seating

##### 15 - Sealing ring

- ☐ replace
- ☐ to be inserted dry into the opening of the fuel tank
- ☐ only moisten the inner seal of the flange with fuel for fitting purposes



## 16 - Fuel pump

- ☐ removing and installing ⇒ [page 174](#)
- ☐ Check fuel delivery unit ⇒ [page 180](#)
- ☐ Note installation position on the fuel tank ⇒ [page 166](#)
- ☐ with sender for fuel gauge display - G-
- ☐ Removing and installing fuel gauge sender - G- ⇒ [page 179](#) .
- ☐ Clean strainer if dirty

## 17 - Lock ring, 110 Nm

- ☐ check for firm seating
- ☐ use wrench - T30101 (3087)- for removing and installing

## 18 - Feed line

- ☐ black
- ☐ clipped in place on the side of the fuel tank
- ☐ check for firm seating

## 19 - Return-flow line

- ☐ Blue
- ☐ clipped in place on the side of the fuel tank
- ☐ check for firm seating

## 20 - Fuel pump control unit - J538-

- ☐ after replacing, adapt the engine control unit - J623- to the fuel pump control unit - J538- ⇒ Vehicle diagnostic tester
- ☐ check ⇒ Vehicle diagnostic tester

## 21 - Fuel tank lid unit

- ☐ with rubber bowl
- ☐ Removing and installing ⇒ Body Work; Rep. gr. 55

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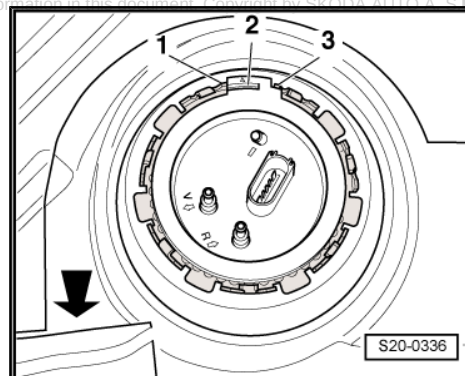
## Fitting location of the fuel delivery unit

The peg -2- on the fuel delivery unit must be between the pegs -1- and -3-.



### Note

- ◆ The -arrow- shows the direction of travel.
- ◆ The fuel delivery unit can only be installed in this position.



## 1.2 Fuel containers for vehicles with all-wheel drive - Summary of components

### 1 - Feed line

- ☐ black
- ☐ check for firm seating

### 2 - Return-flow line

- ☐ Blue
- ☐ check for firm seating

### 3 - Sealing ring

- ☐ replace
- ☐ to be inserted dry into the opening of the fuel tank
- ☐ only moisten the inner seal of the flange with fuel for fitting purposes

### 4 - Fuel pump

- ☐ removing and installing  
⇒ [page 176](#)
- ☐ Check fuel delivery unit  
⇒ [page 180](#)
- ☐ Note installation position on the fuel tank  
⇒ [page 168](#)
- ☐ with sender for fuel gauge display - G-
- ☐ Removing and installing fuel gauge sender - G-  
⇒ [page 179](#) .
- ☐ Clean strainer if dirty

### 5 - Lock ring, 110 Nm

- ☐ check for firm seating
- ☐ use wrench - T30101 (3087)- for removing and installing

### 6 - Fuel pump control unit - J538-

- ☐ after replacing, adapt the engine control unit - J623- to the fuel pump control unit - J538- ⇒ Vehicle diagnostic tester
- ☐ check ⇒ Vehicle diagnostic tester

### 7 - Screw cap

- ☐ replace if damaged

### 8 - Mounting part

### 9 - Fuel tank lid unit

- ☐ with rubber bowl
- ☐ Removing and installing ⇒ Body Work; Rep. gr. 55

### 10 - Earth connection

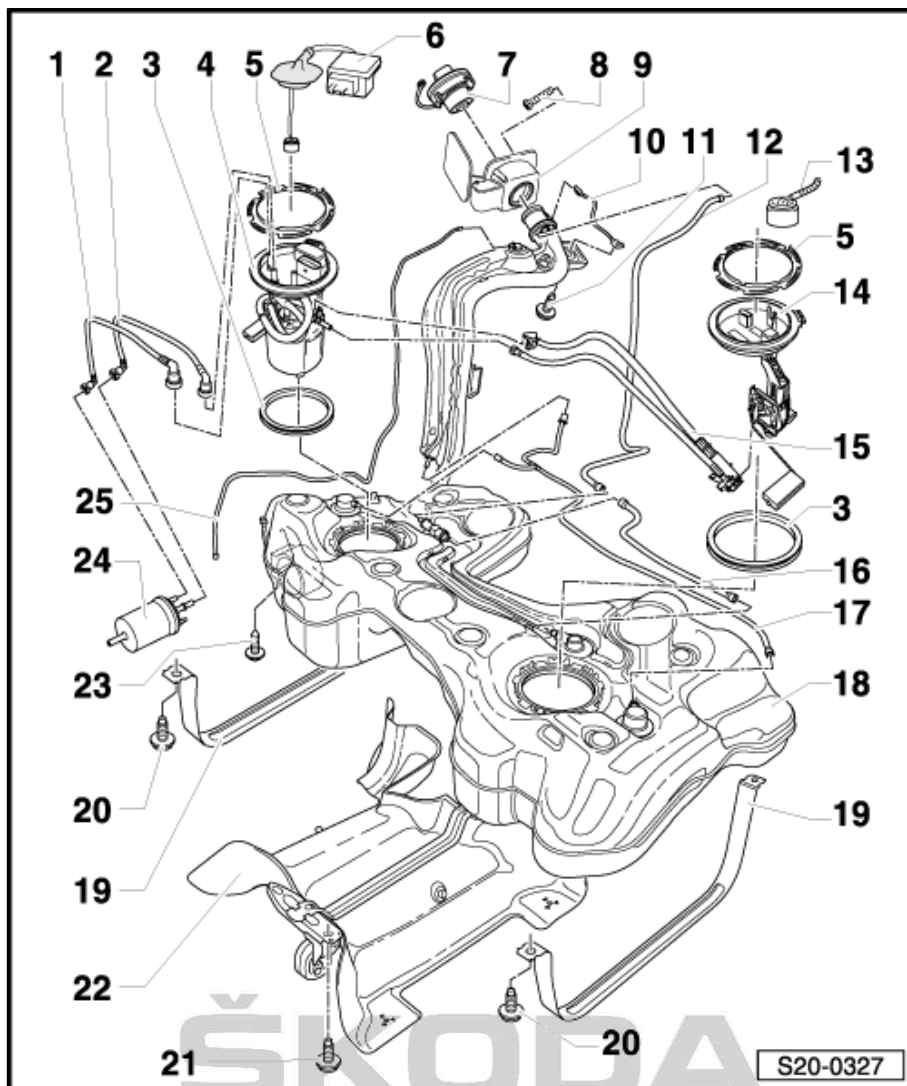
- ☐ check for firm seating

### 11 - 11 Nm

### 12 - Tank ventilation

### 13 - Connector

- ☐ Fuel gauge sender 2 - G169-







#### 14 - Fuel gauge sender 2 - G169-

- ☐ removing and installing ⇒ [page 187](#)

#### 15 - Suction spray pump

- ☐ clipped in place on fuel gauge sender 2 - G169-
- ☐ removing and installing ⇒ [page 190](#)

#### 16 - Tank ventilation

#### 17 - Vent line

#### 18 - Fuel tank

- ☐ when removing, support using the engine/gearbox jack , e.g. -V.A.G 1383 A-
- ☐ removing and installing ⇒ [page 171](#)

#### 19 - Tensioning strap

- ☐ Check installation position

#### 20 - 25 Nm

- ☐ replace

#### 21 - 25 Nm

- ☐ replace

#### 22 - Protection plate

- ☐ riveted together with hanger of exhaust system

#### 23 - 3 Nm

#### 24 - Fuel filter

- ☐ Fitting position ⇒ [page 169](#)

#### 25 - Vent line

- ☐ clipped in place on the side of the fuel tank
- ☐ check for firm seating

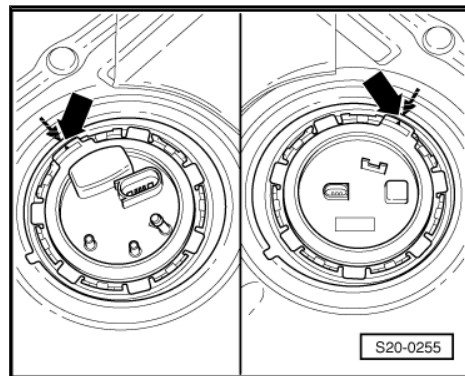
#### Installation position of the flange of the fuel delivery unit (with sender for fuel gauge display - G- ) and the flange with fuel gauge sender 2 - G169-

The markings on the flanges must be aligned with markings on the fuel tank -arrows-.



#### Note

*The arrows on the fuel tank are hardly visible due to the floor panel.*



## 1.3 Fuel filter - Summary of components

### 1 - Fuel filter

- ☐ with installed pressure limiting valve for fuel return-flow line

Opening pressure:  
0.60...0.68 MPa (6.0...  
6.8 bar)

- ☐ do not interchange connections
- ☐ Fitting position  
⇒ [page 169](#)

### 2 - Fuel feed line

- ☐ black
- ☐ from fuel tank
- ☐ press in the circlip to unlock

### 3 - Fuel return-flow line

- ☐ Blue
- ☐ to fuel tank
- ☐ press in the circlip to unlock

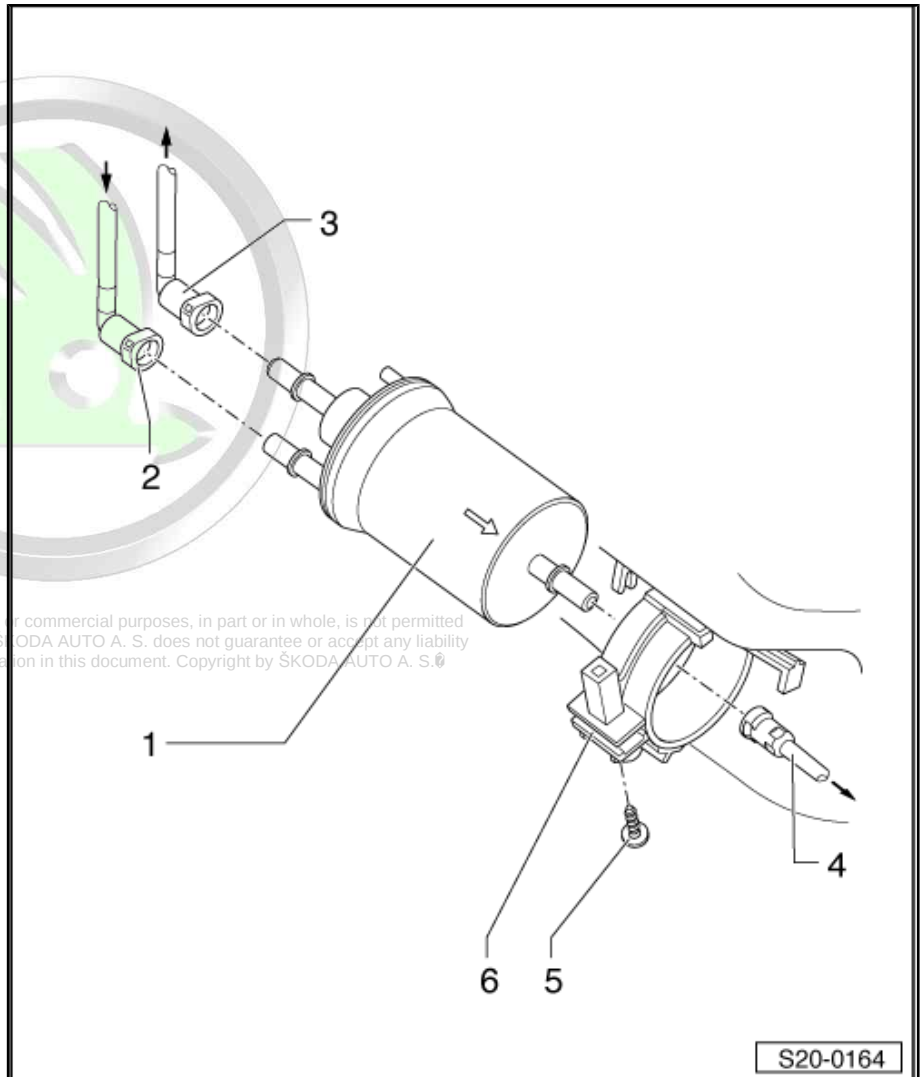
### 4 - Fuel feed line

- ☐ black
- ☐ to the engine
- ☐ press in the circlip to unlock

### 5 - 3 Nm

### 6 - Support

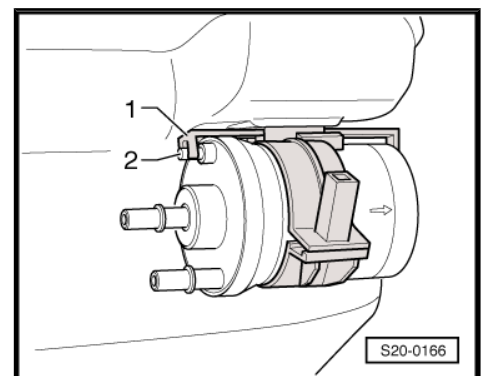
- ☐ for fuel filter
- ☐ attached to the fuel tank



### Fitting position of the fuel filter

The pin -2- at the filter housing must engage in the recess -1- of the bracket.

The direction of flow is marked by arrows.



## 1.4 Extract fuel from the fuel tank

### Special tools and workshop equipment required

- ◆ Hose adapter , e.g. -V.A.G 1318/16-
- ◆ Adapter , e.g. -V.A.G 1318/17-
- ◆ Measuring tool set , e.g. -V.A.G 1594 C-



- ◆ Battery
- ◆ Fuel tank

### Work procedure



#### Note

- ◆ *Safety precautions when working on the fuel supply system*  
⇒ [page 4](#) .
- ◆ *Observe cleanliness requirements when working on the fuel system* ⇒ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- with the fuel pump control unit - J538- -2-.



#### Note

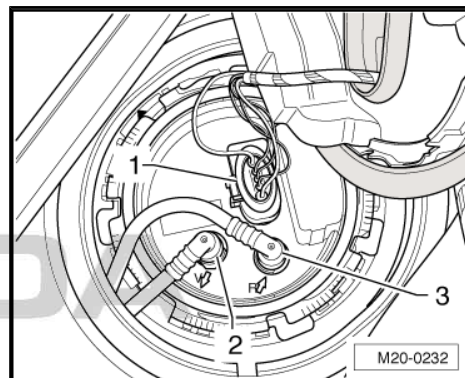
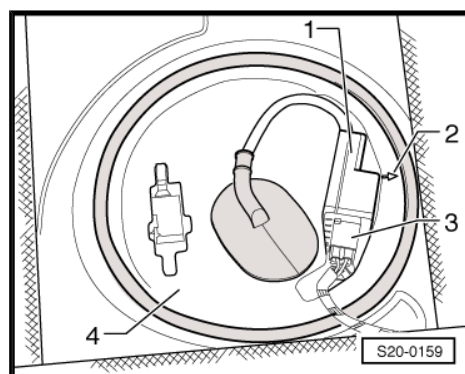
*For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be separated.*

- Unplug the 5-pin plug -1- from the black feed line -2-.



#### Note

*Press in the securing ring in order to unlock the line.*



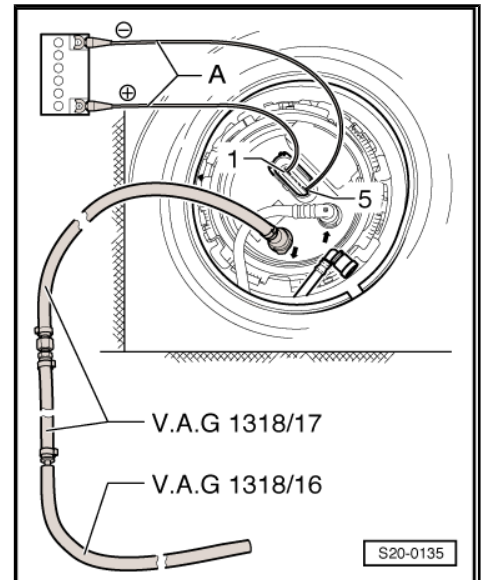
- Connect adapter - V.A.G 1318/16- and -V.A.G 1318/17- and connect this “drain line” to the supply connection of the fuel pump.
- Hold the “drain pipe” in a suitable catch pan for fuel.
- Connect the battery and the contacts of the fuel pump with adapter cables -A- from the adapter cable set - V.A.G 1594/ C- as follows:  
Battery positive terminal (+) to contact -1- of the fuel pump.  
Battery negative terminal (-) to contact -5- of fuel pump.

The fuel pump runs and suctions off fuel.



#### WARNING

*In order to prevent an overflow of fuel in case of a too small fuel tank, the fuel pump must not run unattended.*



## 1.5 Removing and installing the fuel tank

Special tools and workshop equipment required

- ◆ Engine and gearbox jack . e.g. -V.A.G 1383 A-

### 1.5.1 Removing

- The fuel tank must not be more than  $\frac{1}{4}$  full.



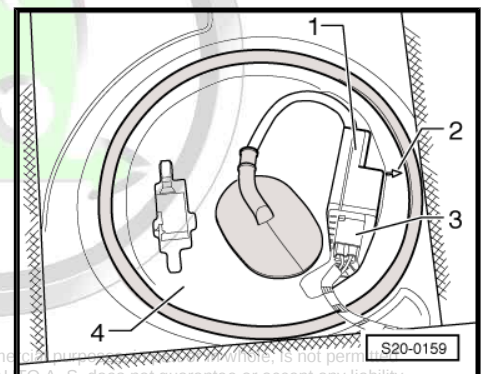
#### Note

- ◆ If necessary, extract fuel from the fuel tank ⇒ [page 169](#) .
- ◆ Safety precautions when working on the fuel supply system ⇒ [page 4](#) .
- ◆ Observe cleanliness requirements when working on the fuel system ⇒ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Unclip cover -1- with the fuel pump control unit - J538- -2-.



#### Note

*For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be separated.*

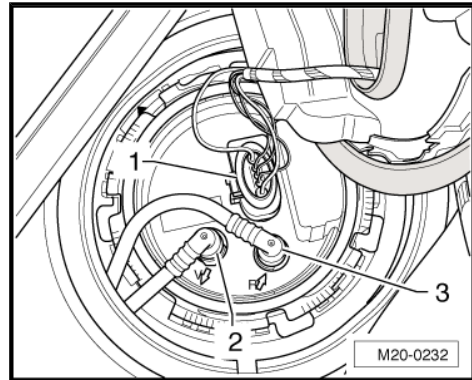


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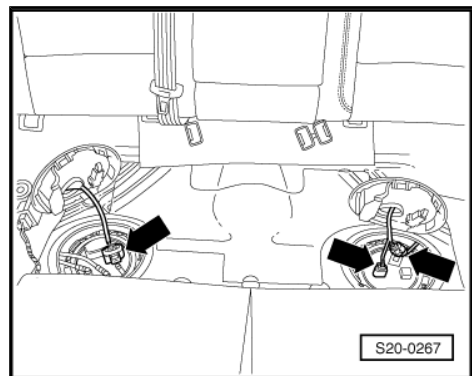
- Unplug the 5-pin plug -1- from the fuel pump.

#### Vehicles with four-wheel drive



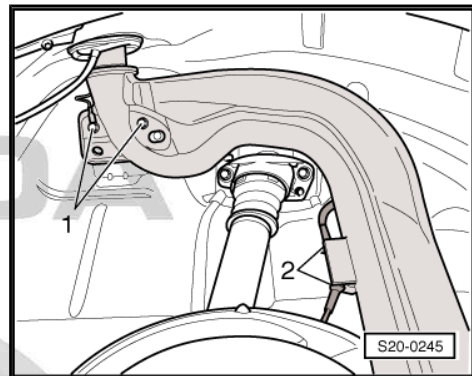
- Remove the cover of the fuel gauge sender 2 - G169- (in the figure on the right) and unplug the plug -right arrows-.
- Remove propshaft ⇒ Gearbox; Rep. gr. 39 .

#### Continued for all vehicles



- Clean area around fuel filler neck.
- Unscrew right rear wheel.
- Remove the rear right wheelhouse liner ⇒ Body Work; Rep. gr. 66 .

- Unscrew screws -1- for filler neck on the body.
- Unclip the electrical cable from the bracket -2- at the top and bottom of the filler neck.

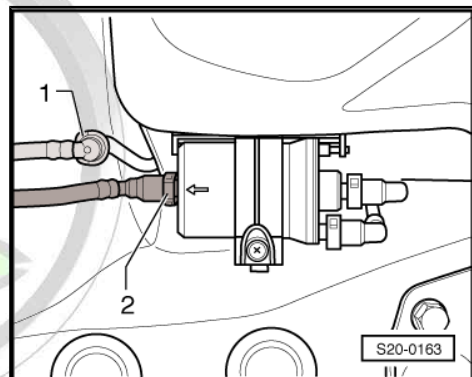


- Disconnect vent line -1- (white) and fuel feed line -2- (black) at the connection point.



#### Note

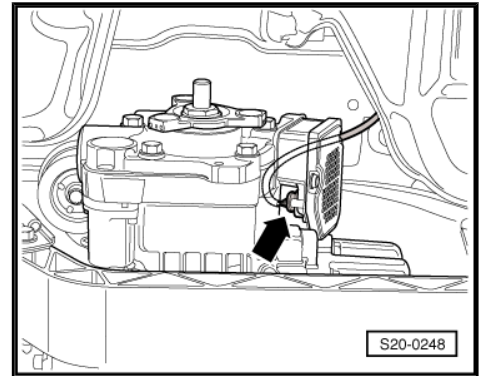
- ♦ For vehicles with auxiliary heating, the fuel line for the dosing pump - V54- must be disconnected additionally.
- ♦ Press in the securing ring in order to unlock the line.



#### Vehicles with four-wheel drive



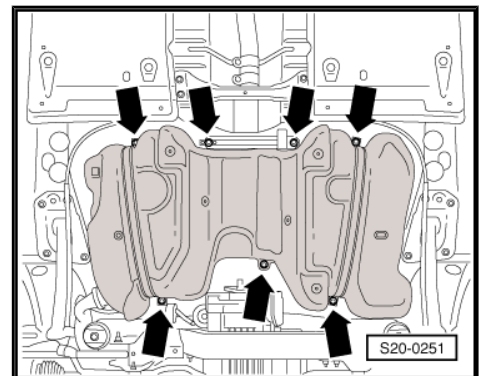
- Disconnect plug -arrow- at four-wheel drive control unit - J492- .



- Support the fuel tank using the engine and gearbox jack - V.A.G 1383 A- . Unscrew the straps and fixing screws.

#### Vehicles with front-wheel drive

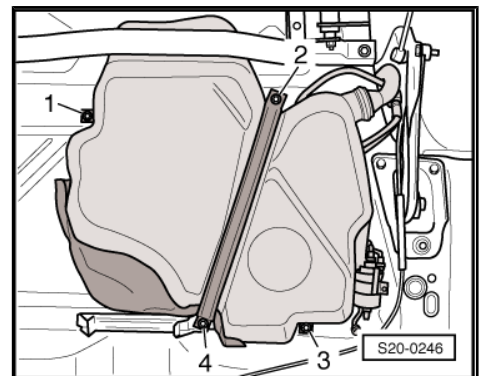
- Remove the front part of the exhaust system ➔ [page 288](#) , except vehicles with engine identification characters BWA.



- Release fixing screws -2- and -4- and remove the tensioning strap.
- Support the fuel tank using the engine and gearbox jack - V.A.G 1383 A- .
- Release fixing screws -1- and -3-.

#### Continued for all vehicles

- Slightly lower the fuel tank.



#### Note

*The filler neck must be "extracted" between body and rear axle.  
Lift fuel tank down from the engine and gearbox jack - V.A.G 1383 A- with a 2nd mechanic.*

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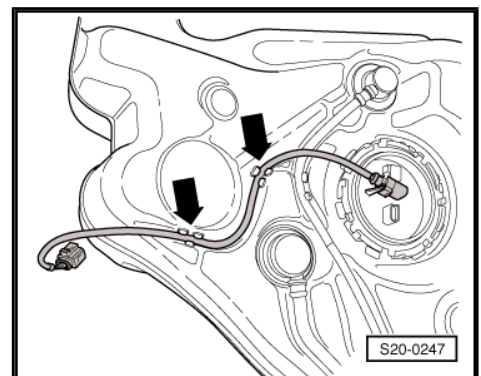
## 1.5.2 Install

#### Vehicles with four-wheel drive

- Clip the line for the four-wheel drive control unit - J492- into the mountings -arrows- on the fuel tank.

#### Continued for all vehicles

- Check both earth connections for corrosion, if necessary remove corrosion.





- Check fitting position of the earth lead -1-.
- The plug -1- on the metal plate ring -2- must be placed on firmly.
- The contact tab -4- must be hung on the fuel tank -3- and secured with the spacer bush -5-.
- Guide the filler neck between rear axle and structure with the assistance of a 2nd mechanic. Then position the fuel tank onto the engine/gearbox jack - V.A.G 1383 A- .

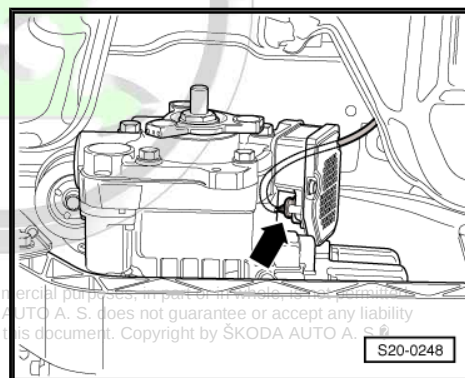
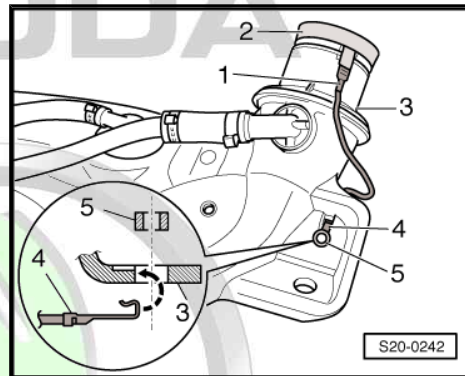
#### Vehicles with four-wheel drive

- Connect plug -arrow- to the four-wheel drive control unit - J492- .

#### Continued for all vehicles

Further installation occurs in reverse order. Pay attention to the following:

- ◆ Lay the vent and fuel lines without any kinks.
- ◆ Do not mix-up the feed line and the return-flow line (the return-flow line is blue, the feed line is black).
- ◆ Make sure the line connections fit tightly.
- ◆ Check earth connection of fuel tank/body at filler neck.
- ◆ After installing the fuel tank, check whether the lines are also clipped in place on the fuel tank.



## 1.6 Removing and installing the fuel delivery unit on vehicles with front-wheel drive

#### Special tools and workshop equipment required

- ◆ Key - T30101 (3087)-
- ◆ Protective gloves

#### Removing

- The fuel tank must not be more than  $\frac{3}{4}$  full.



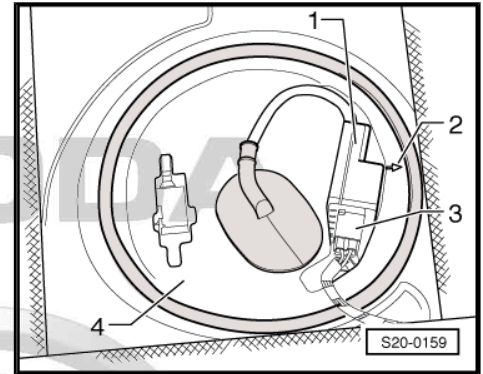
#### Note

- ◆ If necessary, extract fuel from the fuel tank ➔ [page 169](#) .
- ◆ Safety precautions when working on the fuel supply system ➔ [page 4](#) .
- ◆ Observe cleanliness requirements when working on the fuel system ➔ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.
- Removing rear seat bench ➔ Body Work; Rep. gr. 72 .

- Unclip cover -4- with fuel pump control unit - J538- -1-.

**i Note**

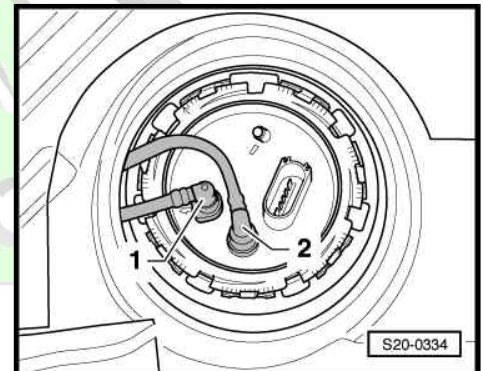
*For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be separated.*



- Unplug the 5-pin plug, the black feed line -1- and the blue return-flow line -2-.

**i Note**

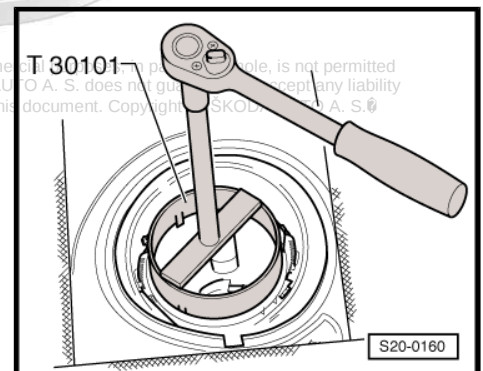
- ◆ Press in the securing ring in order to unlock the line.
- ◆ For vehicles with auxiliary heating the suction line for the dosing pump - V54- must be pulled out additionally (open lower clamp).



- Open lock ring with the wrench - T30101- .

**i Note**

- ◆ You must wear protective gloves for removing the fuel delivery unit.
- ◆ Remove the fuel delivery unit from the fuel tank so that the cables and fuel hoses are not damaged and the float arm on the fuel gauge display sender - G- is not bent.
- ◆ You must empty the old delivery unit before disposing of it if you wish to replace the fuel delivery unit.



- Pull the fuel delivery unit out of the opening of the fuel tank.

## Install

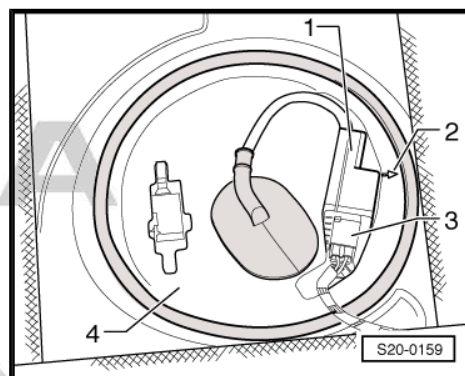
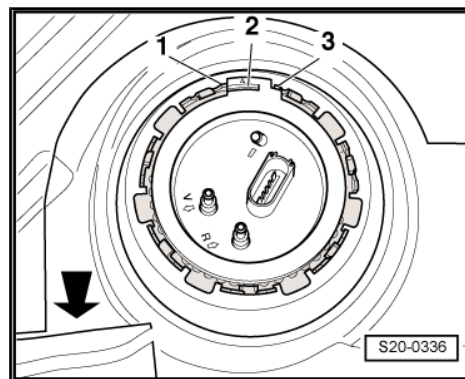
Installation occurs in reverse order. Pay attention to the following:

- Insert the new dry gasket ring for the flange into the opening of the fuel tank and moisten only from the inside with fuel for installing the closing flange.
- Insert the fuel delivery unit into the fuel tank in such a way that the float arm of the sender for the fuel gauge display - G- is not bent.



### Note

- ◆ *Observe installation position of the fuel delivery unit flange. The peg -2- on the fuel delivery unit must be between the pegs -1- and -3-. The -arrow- shows the direction of travel.*
  - ◆ *Tighten the lock ring to 110 Nm.*
  - ◆ *Do not interchange the black feed line with the blue return-flow line (arrows on the flange of the fuel delivery unit).*
  - ◆ *Make sure the line connections and the 5-pin plug fit tightly.*
  - ◆ *After installing the fuel delivery unit, check whether the feed line and the return-flow line have also been clipped in place on the fuel tank.*
- Press the closing flange downwards, install the lock ring and connect the fuel lines.
  - Clip on cover -4- with fuel pump control unit - J538- -1-. The arrow -2- on the cover points in direction of travel.



## 1.7 Removing and installing the fuel delivery unit on vehicles with four-wheel drive

### Special tools and workshop equipment required

- ◆ Wrench for the lock ring - T30101 (3087)-
- ◆ Protective gloves

### Removing

- The fuel tank must not be more than  $\frac{1}{3}$  full.



### Note

- ◆ *If necessary, extract fuel from the fuel tank ➔ [page 169](#). S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by ŠKODA AUTO A. S. ©*
  - ◆ *Safety precautions when working on the fuel supply system ➔ [page 4](#).*
  - ◆ *Observe cleanliness requirements when working on the fuel system ➔ [page 6](#).*
- Switch off ignition and pull out ignition key.
  - Removing rear seat bench ➔ Body Work; Rep. gr. 72 .
  - Remove the cover from the fuel delivery unit.

**i** Note

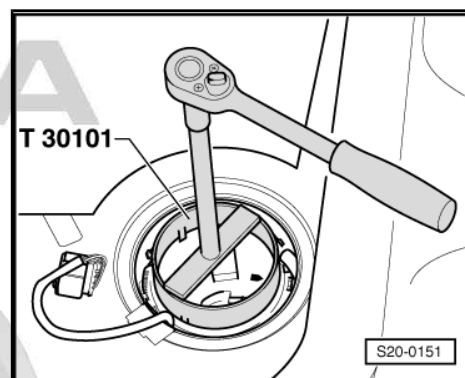
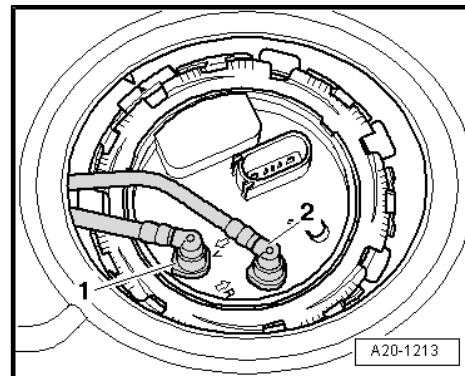
*For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be separated.*

- Disconnect the plug, the black feed line -1- and the blue return-flow line -2- from the flange.

**i** Note

- ◆ Press in the securing ring in order to unlock the line.
- ◆ For vehicles with auxiliary heating the suction line for the dosing pump - V54- must be pulled out additionally (open lower clamp).

- Open lock ring with the wrench - T30101- .
- Pull closing flange and gasket ring for fuel pump out of the opening of the fuel tank and place to the side with the connected lines.



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- Separate through the opening of the fuel tank the fuel line -1- to the suction jet pump, to do so press the release button.
- Unhook the fuel delivery line -2- at the fuel delivery unit, to do so pull the fixing clamp upwards -arrow-.



### Note

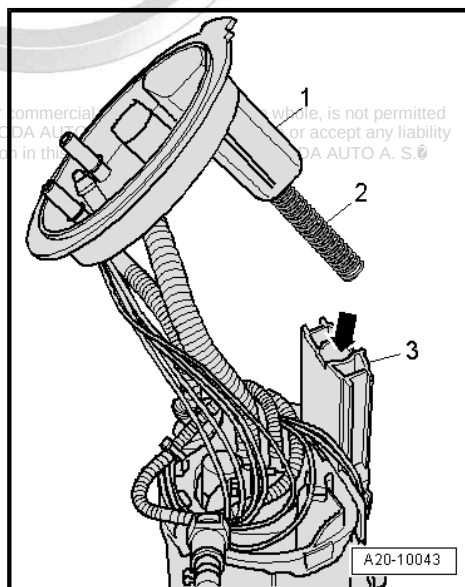
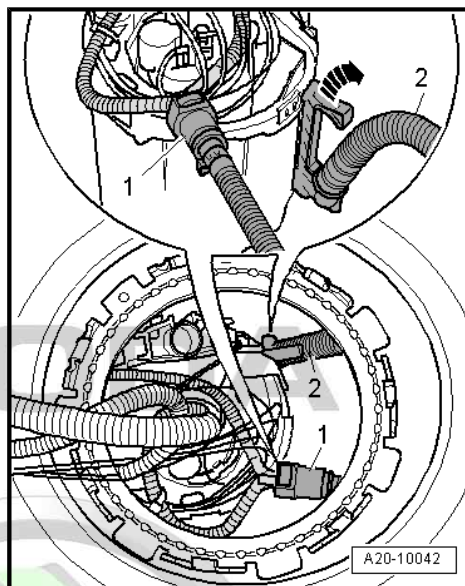
- ◆ *You must wear protective gloves for removing the fuel delivery unit.*
  - ◆ *Remove the fuel delivery unit from the fuel tank so that the cables and fuel hoses are not damaged and the float arm on the fuel gauge display sender - G- is not bent.*
  - ◆ *You must empty the old delivery unit before disposing of it if you wish to replace the fuel delivery unit.*
- Pull the fuel delivery unit out of the opening of the fuel tank.

### Install

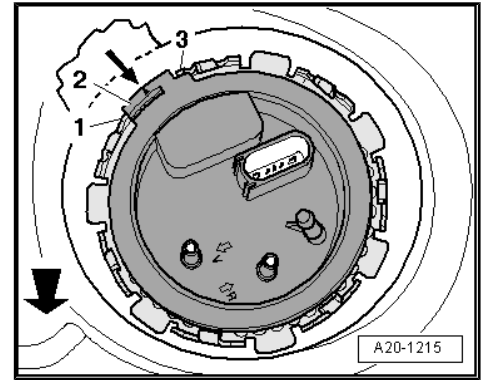
The installation of the fuel delivery unit occurs in the reverse order. Pay attention to the following:

- Insert the fuel delivery unit into the fuel tank with the closing flange placed to the side. Thus, do not bend the float arm of the fuel gauge sender unit - G- .
- Install the fuel delivery unit and the fuel line.
- Insert the new dry gasket ring for the flange into the opening of the fuel tank and moisten only from the inside with fuel for installing the closing flange.
- Slide the spring -2- into the guide opening -arrow- and fit the guide -1- of the closing flange into the guide -3- of the fuel delivery unit.
- Press the closing flange down and bring it into the installation position.

Further information:



- ◆ Observe the fitting location of the fuel delivery unit. The peg -2- at the closing flange must be located between the pegs -1- and -3-. The -thick arrow- points in the direction of travel.
- ◆ Tighten the lock ring to 110 Nm.
- ◆ Do not interchange feed line and return-flow line.
- ◆ Make sure the fuel lines fit tightly.
- ◆ After installing the fuel delivery unit, check whether the feed line and the return-flow line are still clipped in place on the fuel tank.



## 1.8 Removing and installing the sender for fuel gauge display - G-



### Note

There are two types of senders for the fuel gauge display - G- installed in the vehicles.

### Sender for fuel gauge display - G- type 1

#### Removing

- Remove fuel delivery unit:
- ◆ Vehicles with front-wheel drive ➔ [page 174](#) .
- ◆ Vehicles with four-wheel drive ➔ [page 176](#) .
- Unlatch and disconnect the plug connection of the lines -1- (brown), -2- (blue) and -3- (black).
- Raise securing tabs -4- and -5- with a screwdriver and pull off the sender for fuel gauge display - G- towards the bottom -arrow-.

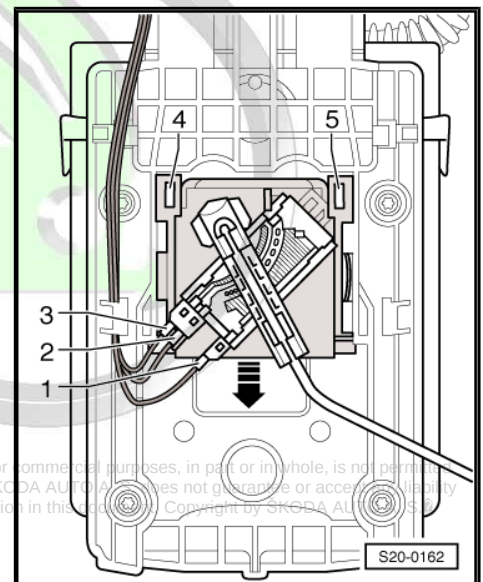
#### Install

- Insert the sender for the fuel gauge display - G- in the guides at the fuel delivery unit and press upwards until it latches into position.
- Connect the cables and check the plugs for secure catch.
- Install fuel delivery unit:
- ◆ Vehicles with front-wheel drive ➔ [page 174](#) .
- ◆ Vehicles with four-wheel drive ➔ [page 176](#) .

### Sender for fuel gauge display - G- type 2

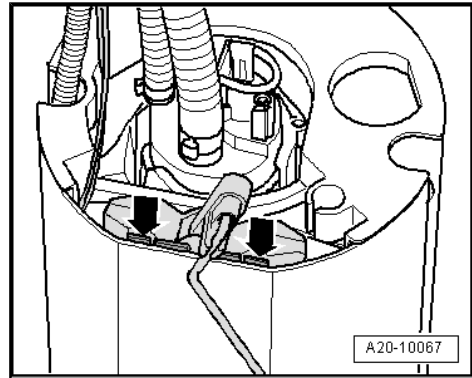
#### Removing

- Remove fuel delivery unit:
- ◆ Vehicles with front-wheel drive ➔ [page 174](#) .
- ◆ Vehicles with four-wheel drive ➔ [page 176](#) .





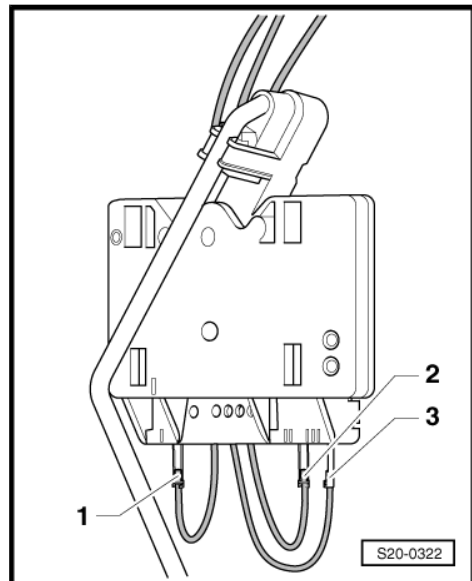
- Unlock the securing tabs -arrows- using a screwdriver and pull out the transmitter for fuel gauge display - G- towards the top.



- Unlatch and disconnect the plug connection of the lines -1- (brown), -2- (blue) and -3- (black).

#### Install

- Connect the cables and check the plugs for secure catch.
- Insert the sender for fuel gauge display - G- in the guides at the fuel delivery unit and press downwards until it latches into position.
- Install fuel delivery unit:
- ♦ Vehicles with front-wheel drive ➔ [page 174](#) .
- ♦ Vehicles with four-wheel drive ➔ [page 176](#) .



## 1.9 Testing fuel pump

### Special tools and workshop equipment required

- ♦ Key - T30101 (3087)-
- ♦ Pressure gauge , e.g. -V.A.G 1318-
- ♦ Adapter , e.g. -V.A.G 1318/1-
- ♦ Adapter , e.g. -V.A.G 1318/11-
- ♦ Hose adapter , e.g. -V.A.G 1318/16-
- ♦ Adapter set , e.g. -V.A.G 1318/17-
- ♦ Double connection piece , e.g. -V.A.G 1318/23-
- ♦ Remote control , e.g. -V.A.G 1348/3A- with adapter cable , e.g. -V.A.G 1348/3-3-
- ♦ Voltage tester , e. g. -V.A.G 1527 B-
- ♦ Measuring tool set , e.g. -V.A.G 1594 C-
- ♦ Vehicle diagnosis, measurement and information system - VAS 5051B-
- ♦ Measuring glass

### 1.9.1 Checking function and voltage supply

#### Test conditions

- Battery voltage at least 11.5 V.

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- Fuel pump fuse O.K. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK.
- Fuel pressure sender for low-pressure - G410- (if present) OK

#### Test sequence



#### Note

*The fuel pump is tested with actuator diagnosis ⇒ Vehicle diagnostic tester.*

- Connect vehicle diagnosis, measurement and information system - VAS 5051 B- .
- Switch on ignition.
- Select the “Vehicle self-diagnosis” function, then the “actuator diagnosis” and start the fuel pump.
- The fuel pump must now run slowly to the maximum speed.



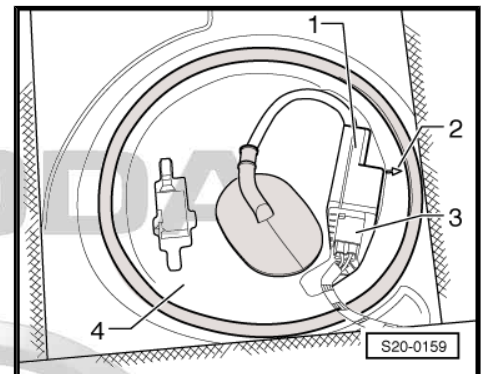
#### Note

*The fuel pump runs very quietly.*

- Switch off ignition.

#### The fuel pump does not run:

- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Disconnect plug from fuel pump control unit - J538- .



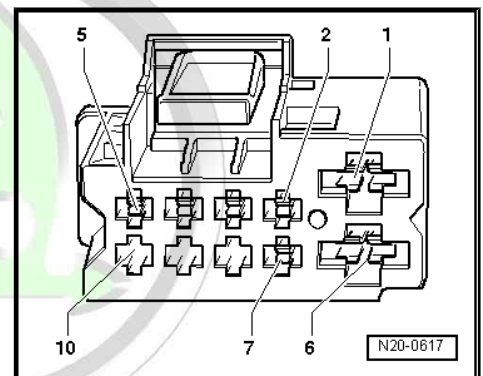
- Testing the voltage supply with the voltage tester - V.A.G 1527 B- between contact -1- and -6-.
- The LED must light up.

The LED does not light up:

- Determine and remove open circuit in the wiring according to the current flow diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

The LED lights up (power supply O.K.):

- Remove fuel delivery unit ⇒ [page 174](#) .
- Check whether the electric wiring between the flange and fuel pump is connected.



If there is no open circuit in the wiring, the fuel pump is defective:

- Replace fuel pump ⇒ [page 174](#)

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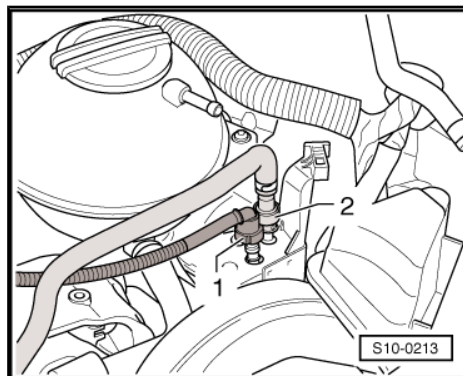


## 1.9.2 Checking fuel pressure



### Note

- ♦ *Safety precautions when working on the fuel supply system*  
⇒ [page 4](#) .
- ♦ *Observe cleanliness requirements when working on the fuel system* ⇒ [page 6](#) .
- Disconnect the fuel feed line -2- (press in the circlip) and use a cleaning cloth to catch the fuel that flows out.



- Connect the pressure gauge - V.A.G 1318- with the adapter - V.A.G 1318/1- and the adapter set - V.A.G 1318/17- to the fuel feed line.
- Open shut-off cock of the pressure gauge. The lever then points in position -A-.
- Switch the ignition on and off so often until the fuel pressure on the pressure gauge does no longer rise.
- Read off fuel pressure on pressure gauge.  
Specified value: 0.35...0.5 MPa (3.5...5.0 bar)

### If fuel line is o.k.:

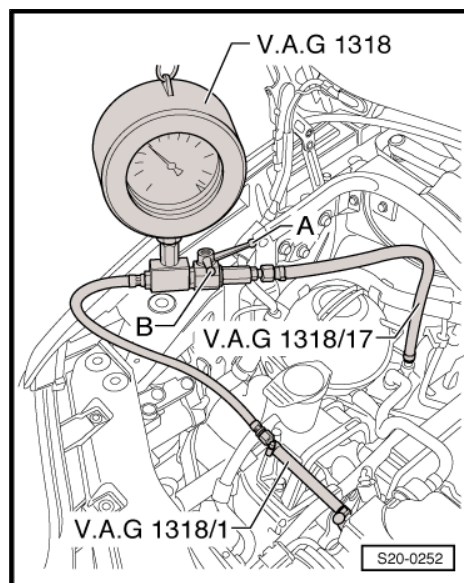
- Test holding pressure ⇒ [page 183](#) .

### If the specified pressure is exceeded:

- Check the return line between the fuel filter and fuel pump for kinks and blockages.

If no errors are detected the pressure limiting valve in the fuel filter is defective:

- Replace fuel filter.



**If the measurement is less than the specification:**  
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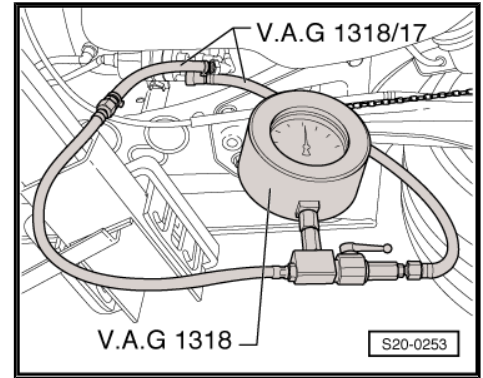


- Check the fuel pressure before the fuel filter. To do so, connect the pressure gauge - V.A.G 1318- with the adapter - V.A.G 1318/17- between the fuel filter and fuel feed line.
- Open shut-off cock of the pressure gauge. Lever points in direction of flow.
- Start engine and run in idle.



#### Caution

**Only shut off the shut-off cock slowly. At a fuel pressure of 0.8 MPa (8 bar), the shut-off cock must be immediately opened, in order to avoid a damage of the pressure gauge.**



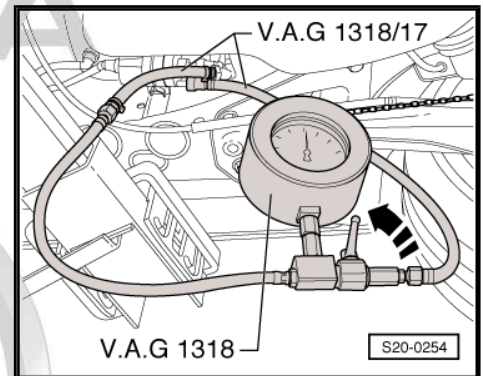
- Slowly close the shutoff cock of the pressure measuring device. The pressure must rise to at least 0.6 MPa (6.0 bar). If 0.6 MPa is reached, immediately open the shut-off cock again!

If the pressure has risen, the fuel pump is OK, but the pressure limiting valve in the fuel filter is defective:

- Replace fuel filter.

If the pressure has not risen, the fuel pump is defective:

- Replace fuel pump ➔ [page 174](#) .



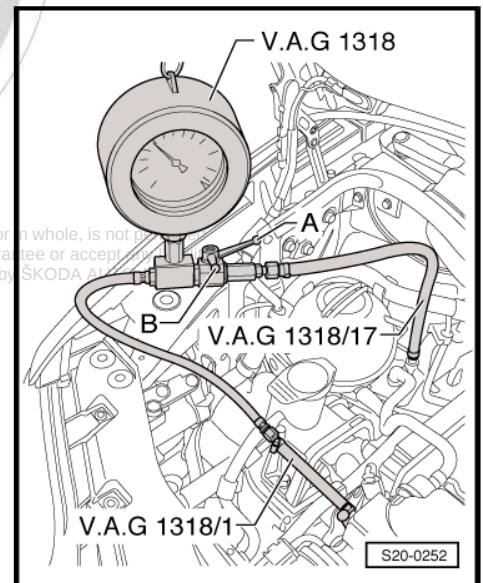
### 1.9.3 Checking holding pressure

- Fuel pressure O.K. and pressure gauge - V.A.G 1318- connected in the engine compartment ➔ [page 182](#) .
- Switch the ignition on and off so often until the fuel pressure on the pressure gauge does no longer rise.
- Read off fuel pressure on pressure gauge. Specified value: 0.35...0.5 MPa (3.5...5.0 bar)
- Observe pressure drop at pressure gauge.

The pressure must not drop below 0.3 MPa (3.0 bar) after 10 minutes.

**If the pressure again drops:**

- Switch the ignition on and off so often until the fuel pressure on the pressure gauge does no longer rise.





- Immediately close the shutoff cock of the pressure measuring device. The lever then points in the position -B-.

**If the pressure again drops:**

- Check the low pressure pipe to the high pressure pump for tightness.

If no fault is found:

- Replace high pressure pump ⇒ [page 259](#) .

**If the pressure does not drop now:**

- Check the fuel line to the fuel filter for tightness.

If the fuel line is not found to be faulty:

- Check the check valve in the fuel delivery unit. To do so, connect the pressure gauge - V.A.G 1318- with the adapter - V.A.G 1318/17- between the fuel filter and fuel feed line.
- Open shut-off cock of the pressure gauge. Lever points in direction of flow.
- Switch the ignition on and off so often until the fuel pressure on the pressure gauge does no longer rise.
- Read off fuel pressure on pressure gauge.

Specified value: 0.35...0.5 MPa (3.5...5.0 bar)

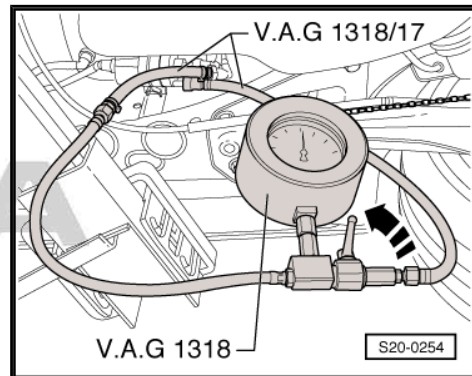
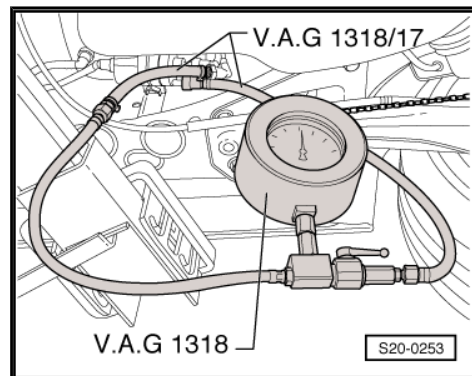
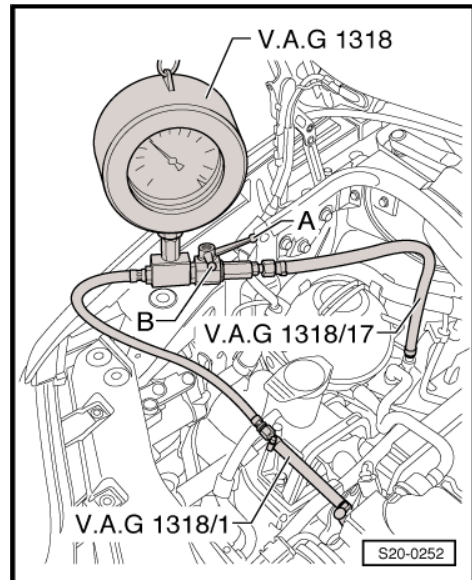
- Immediately close the shut-off cock of the pressure measuring device after the pressure has built up.
- Observe pressure drop at pressure gauge.  
The pressure must not drop below 0.3 MPa (3.0 bar) after 10 minutes.

If the pressure drops, the non-return valve in the fuel pump is defective:

- Replace fuel pump ⇒ [page 174](#) .

If the pressure does not drop, the pressure limiting valve in the fuel filter is defective:

- Replace fuel filter.



## 1.9.4 Check fuel flow rate



**Note**

- ♦ *Safety precautions when working on the fuel supply system* ⇒ [page 4](#) .
- ♦ *Observe cleanliness requirements when working on the fuel system* ⇒ [page 6](#) .
- Switch off ignition and all electrical loads, and pull out ignition key.

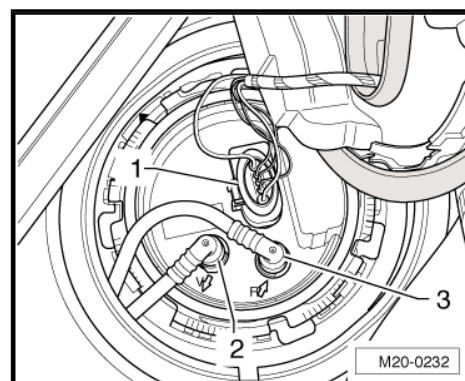
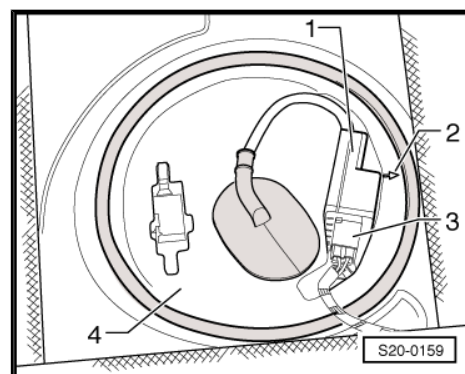
- Removing rear seat bench ⇒ Body Work; Rep. gr. 72 .
- Disconnect plug from fuel pump control unit - J538- -2-.



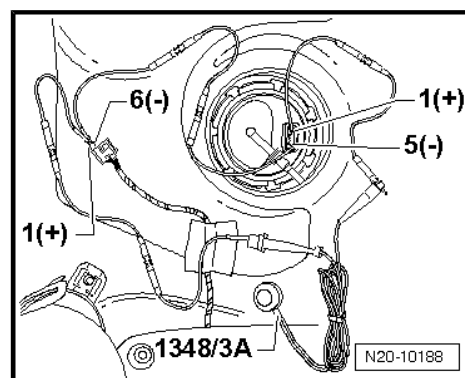
# **Note**

*For vehicles with auxiliary heating, the plug connection for the dosing pump - V54- must also be separated.*

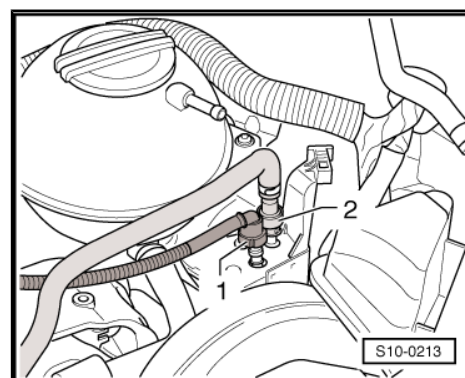
- Remove cover -1-.
- Disconnect plug connection -1-.



- Connect remote control - V.A.G 1348/3A- with auxiliary cables to contact -1(+)- of the fuel pump and contact -1(+)- of the 10-pin connector.
- Connect the contact -6(-)- of the 10-pin connector with the contact -5(-)- of the fuel pump with an auxiliary line from the Adapter set - V.A.G 1594 C- .
- Remove cap from the fuel filler neck.



- Disconnect the fuel feed line -2- (press in the circlip) and use a cleaning cloth to catch the fuel that flows out.





- Connect the pressure gauge - V.A.G 1318- with the double connection piece - V.A.G 1318/23- and the adapter set - V.A.G 1318/17- to the fuel feed line.
- Fit the hose adapter - V.A.G 1318/16- onto the adapter - V.A.G 1318/11- of the pressure measuring device and hold it in a measuring vessel.
- Close the shut-off cock of the pressure measuring device. The lever then points in the position -B-.

**WARNING**

*Danger of liquid spraying out when opening the shut-off valve. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Hold the container in front of the free connection to the pressure gauge.*

- Open shut-off cock of the pressure gauge. The lever then points in the direction of flow -A-.
- Operate remote control - V.A.G 1348/3A- . While doing so, slowly close the shut-off cock until the pressure gauge displays 0.4 MPa (4 bar) pressure. From this point on do not move position of shut-off tap.
- Empty measuring glass.
- The fuel flow rate of the fuel pump is dependent on the battery voltage. For this reason, connect the Multimeter - V.A.G 1715- with auxiliary lines from the Adapter set - V.A.G 1594 C- to the vehicle battery.
- Activate remote control for 30 seconds while measuring the battery voltage.
- Compare the fuel rate with the specified value:

\*) Minimum fuel flow rate 1 cm<sup>3</sup>/30 s.

\*\*) Voltage at the fuel pump when engine is not running and pump is operating (approx. 2 volts less than battery voltage)

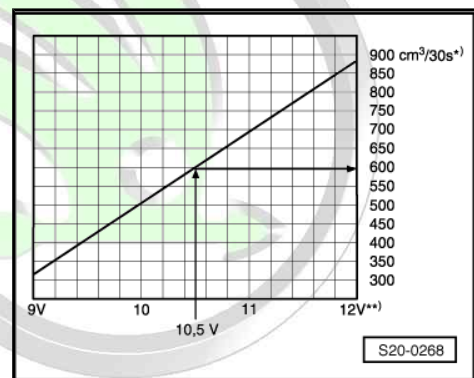
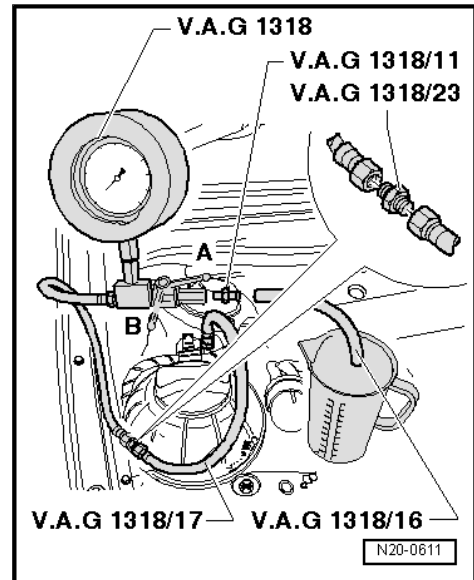
Read out examples:

During the test a voltage of 12.5 V was measured on the battery. As the voltage on the fuel pump is approx. 2 V less than the battery voltage, the minimum flow rate is approx. 580 cm<sup>3</sup>/30 s.

If the minimum fuel delivery volume is not reached:

- Check the fuel lines for possible restrictions (kinks) or blocking.

If no fault is found:



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- Disconnect the feed hose -1- from the fuel filter inlet.
- Connect pressure gauge - V.A.G 1318- with the adapter set - V.A.G 1318/17- to the hose.

- Repeat fuel flow rate test.

If the minimum flow rate is now reached:

- Replace fuel filter.

If the minimum flow rate is again not reached:

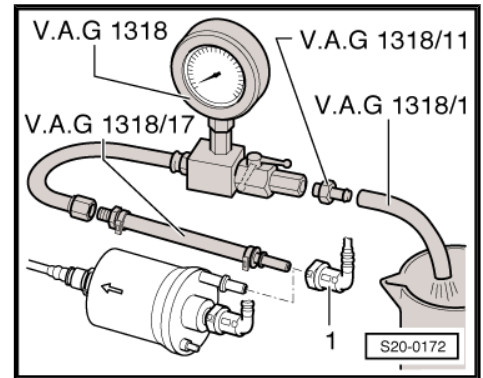
- Remove fuel delivery unit and inspect the filter strainer for soiling.

If you have still not found any fault up to this stage:

- Replace fuel pump ➔ [page 174](#) .

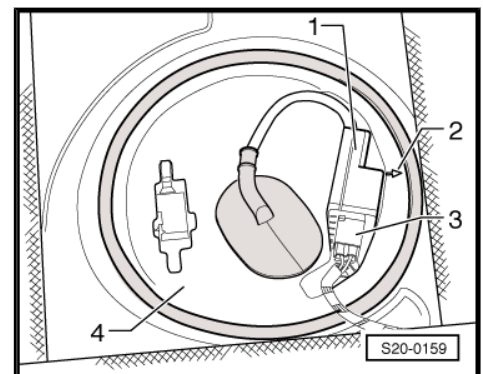
If the required fuel delivery volume has been achieved, but a fault is still suspected in the fuel supply system (e.g. intermittent breakdown of the fuel supply):

- Check current consumption of fuel delivery unit ➔ [page 187](#) .



## 1.9.5 Check power consumption

- Fold up rear seat.
- Unclip cover -4- with fuel pump control unit - J538- -1-.



- Connect the current probe -A- of the vehicle diagnosis, measurement and information system - VAS 5051 B- to line -B- to contact -1- of the 5-pin plug.
- Start engine and run in idle.
- Measure voltage consumption of the fuel pump.

Specified value: max. 9 A

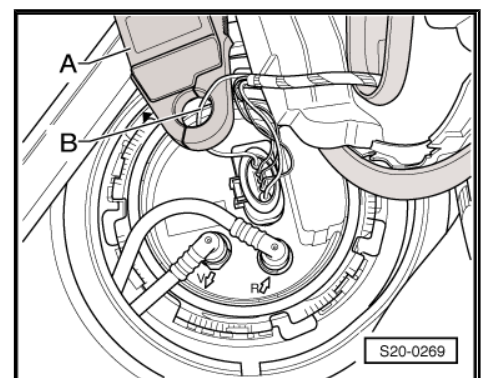


### Note

*If the failure in the fuel supply is occasional the test may be performed during a test drive. A 2nd person is required to do this, however.*

If the power consumption is exceeded, the fuel pump is defective:

- Replace fuel pump ➔ [page 174](#) .



## 1.10 Removing and installing fuel gauge sender 2 - G169- for vehicles with four-wheel drive

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Special tools and workshop equipment required





- ◆ Key - T30101 (3087)-
- The fuel tank must not be more than  $\frac{3}{4}$  full.



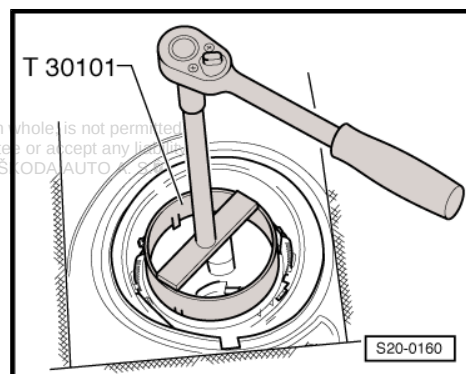
### Note

- ◆ If necessary, extract fuel from the fuel tank ➔ [page 169](#) .
- ◆ Safety precautions when working on the fuel supply system ➔ [page 4](#) .
- ◆ Observe cleanliness requirements when working on the fuel system ➔ [page 6](#) .
- ◆ Make sure that the float arm of the fuel gauge sender 2 - G169- is not bent.

### Removing

- Switch off ignition and all electrical loads, and pull out ignition key.
- Removing rear seat bench ➔ Body Work; Rep. gr. 72 .
- Remove the left cover in direction of travel from the fuel gauge sender 2 - G169- .
- Disconnect the plug from fuel gauge sender 2 - G169- and pull the plug for the four-wheel drive control unit - J492- out of the holder in the flange.
- Open lock ring with the wrench - T30101- .

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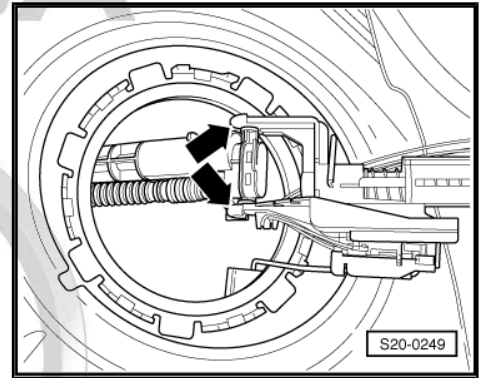
- Pull fuel gauge sender 2 - G169- upwards slightly and detach -arrows-.
- Remove sealing ring.

#### Install



#### Caution

*When installing do not bend the float arm of the fuel gauge sender 2 - G169- .*



- Insert fuel gauge sender 2 - G169- into the fuel tank.
- Position the suction jet pump in the interior of the fuel tank onto the sender. The tabs must engage audibly.
- Insert new dry gasket ring for the flange into the opening of the fuel tank and only now moisten the inside (position of the flange) with fuel.
- Pay attention to the fitting location of the fuel gauge sender 2 - G169- ➔ [page 168](#) .
- Check correct positioning of gasket ring.
- Tighten the lock ring with socket wrench - T30101- .

Tightening torque: 110 Nm

- Connect plug and insert the plug connection into the holder on the flange.
- Install cover.
- Install sill panel ➔ Body Work; Rep. gr. 72 .

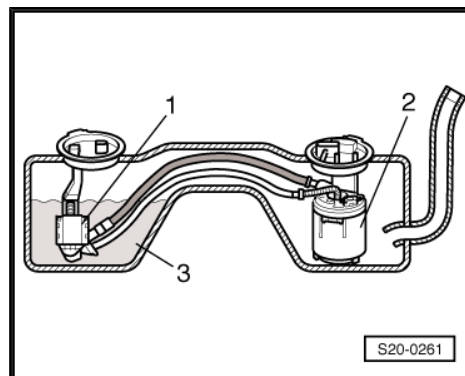


## 1.11 Removing and installing suction spray pump for vehicles with four-wheel drive



### Note

- ◆ On vehicles with four-wheel drive, the fuel tank consists of a left and right chamber. In order to pump the fuel out of the left chamber -3- of the fuel tank into the right chamber to the housing of the delivery unit -2-, a suction jet pump -1- is required.
- ◆ On vehicles with four-wheel drive, the type of fuel tank may require that fuel is pumped from the area of the fuel gauge sender 2 - G169- with a suction spray pump to the fuel delivery unit.
- ◆ A check is only to be carried out, if the engine stops because of fuel shortage, although the fuel gauge still indicates a fuel tank which is  $\frac{1}{4}$  full.



### Work procedure

- Remove fuel delivery unit ➔ [page 174](#) .
- Remove fuel gauge sender 2 - G169- ➔ [page 187](#) .
- Now the suction jet pump can be pulled out from the side of the fuel gauge sender 2 - G169- (left vehicle side).
- Check if the fuel lines are firmly connected to the suction jet pump and are not damaged.
- Check the suction jet pump additionally for possible contamination.

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## 2 Electronic Engine Power Control (Electronic throttle)

### 2.1 Assembly overview - accelerator module

#### 1 - Connector

- ☐ Black, 6-pin.
- ☐ disconnect and fit on  
⇒ [page 193](#)

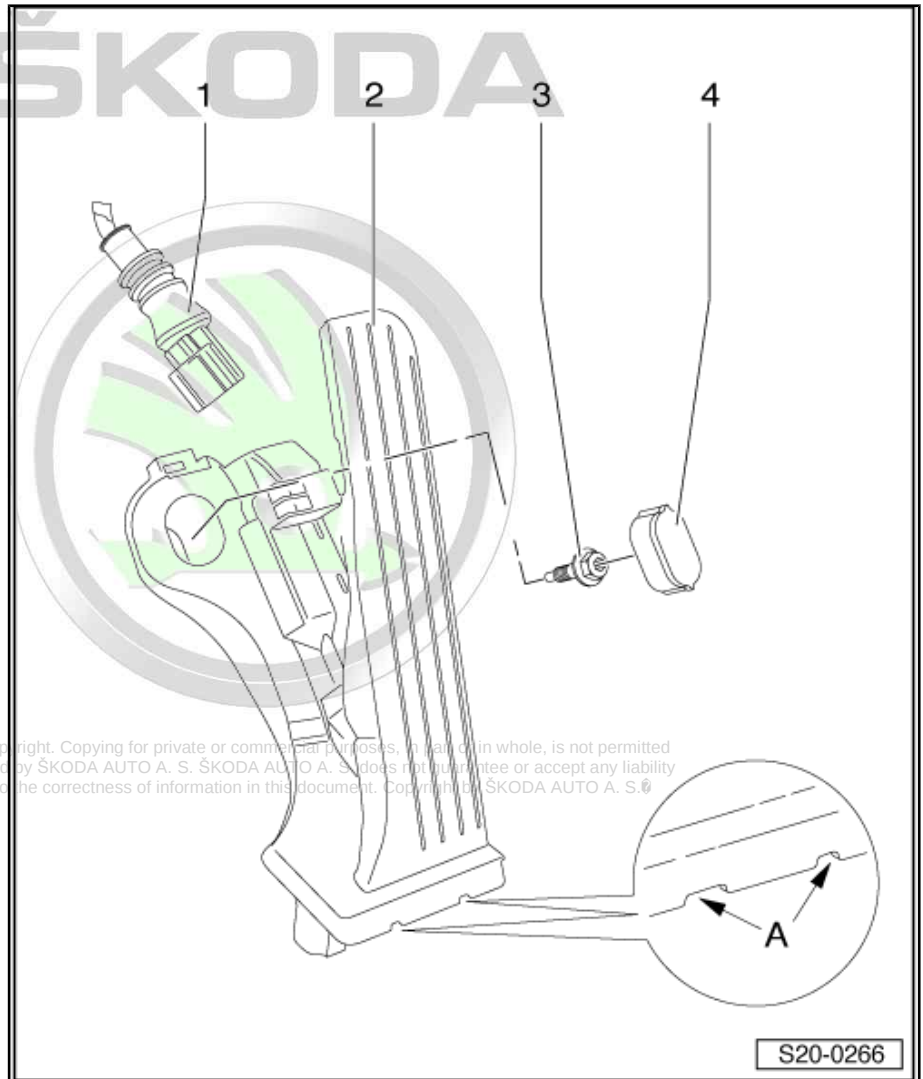
#### 2 - Accelerator pedal position sender - G79- with accelerator pedal position sender 2 - G185-

- ☐ not adjustable
- ☐ the sender transmits the driver's instructions to the engine control unit
- ☐ -A- openings for the release tool
- ☐ removing and installing  
⇒ [page 191](#)
- ☐ when replacing, the engine control unit must be adapted ⇒ Vehicle diagnostic tester on vehicles with automatic gearbox

#### 3 - 10 Nm

#### 4 - Cap

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### 2.2 Removing and installing accelerator pedal module

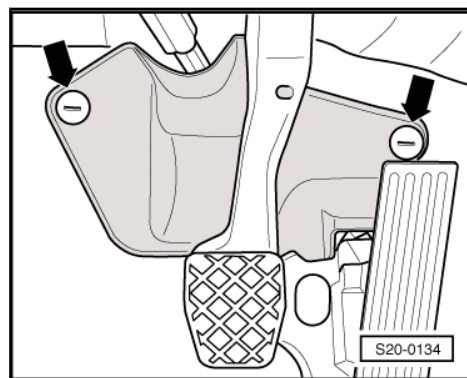
#### Special tools and workshop equipment required

- ◆ Release tool - T10238- (for left-hand drive vehicle)
- ◆ Release tool - T10240- (for right-hand drive vehicle)

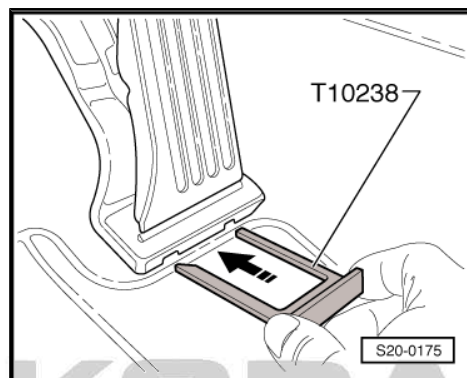


## Removing

- Remove steering column trim panel -arrows-.
- Lever out the cap ( ➤ [page 191](#) Pos. 4) with a screwdriver.
- Release fixing screw ( ➤ [page 191](#) Pos. 3).



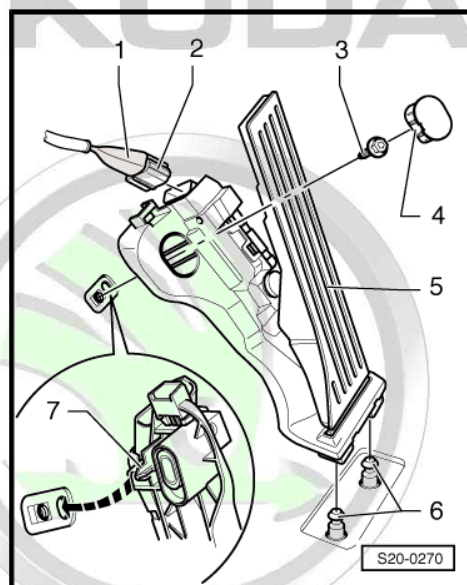
- Push the release tool - T10238- (for right-hand drive vehicles release tool - T10240- ) as shown up to the stop into the provided openings and remove the accelerator pedal module.
- Disconnect connector from accelerator pedal module. To do so press down securing element from plug.



## Install

- Fit the connector -2- onto the accelerator pedal module -5-  
The plug must lock audibly.
- Push accelerator pedal module onto the fixing bolts -6-.
- Insert the centering pin -7- into the hole in the underbody.
- Fasten accelerator pedal module with screw -3- (10 Nm) and fit on cap -4-.
- Re-install steering column trim panel.
- If the accelerator pedal module was replaced, the engine control unit has to be adapted ➤ Vehicle diagnostic tester.

On vehicles with automatic gearbox, adapt the kick-down function after replacing the accelerator pedal module ➤ Vehicle diagnostic tester.





## 2.2.1 Disconnect connector for accelerator pedal module and fit on

### Note

*The different connectors for the accelerator pedal module which are inserted, must be disconnected and fit on in a different manner.*

#### Disconnect connector 1K0 973 706

- Slightly press the piston slide valve -A- (grey) in -direction of arrow 1- and push it up to the stop in -direction of arrow 2-.
- Hold the piston slide valve in this position and disconnect the socket housing -B- in -direction of arrow 3-.

The piston slide valve -A- is pushed into the bottom position.

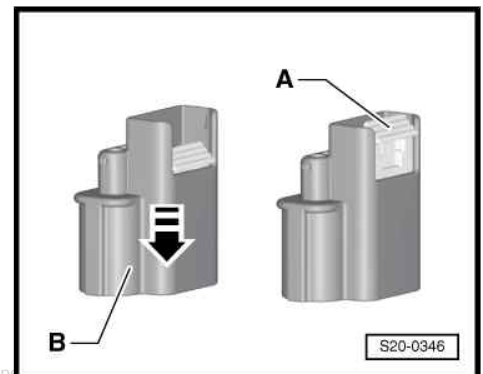
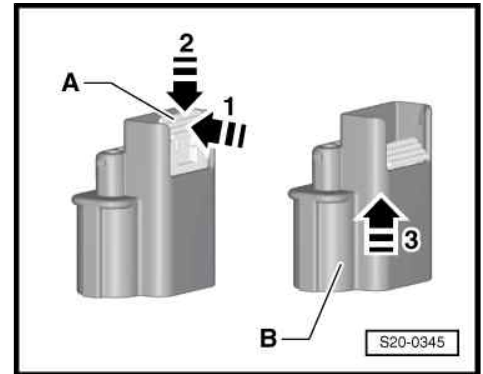
#### Fit on connector 1K0 973 706

- Push the socket housing -B- in -direction of arrow- until the piston slide valve can be heard to lock in place.

The piston slide valve -A- moves automatically upwards.

### Note

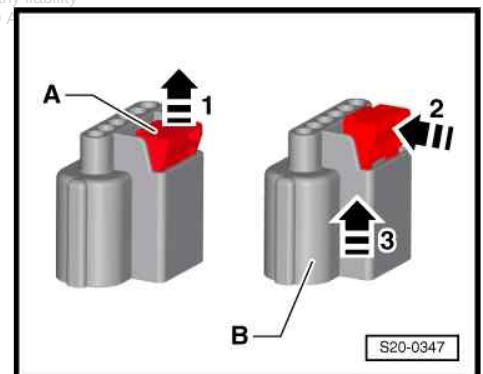
*For safety reasons, check the connector for secure catch by tightening it in the opposite direction.*



#### Disconnect connector 8K0 973 706

- Pull slider -A- (red) in -direction of arrow 1- as far as the stop.
- Press the piston slide valve in -direction of arrow 2- and disconnect the socket housing -B- in -direction of arrow 3-.

The piston slide valve -A- remains in the top position.



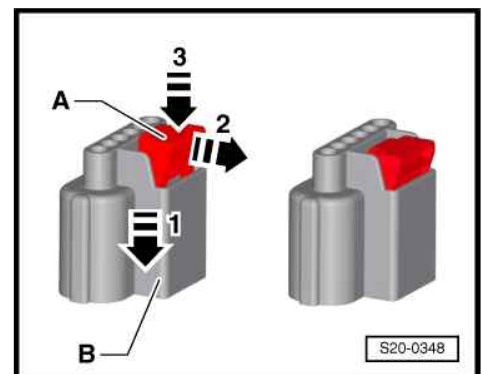
#### Fit on connector 8K0 973 706

- Push the socket housing -B- up to the stop in -direction of arrow 1-.
- Slightly press the piston slide valve in -direction of arrow 2- and push it in -direction of arrow 3-.

The piston slide valve -A- can only be pushed down if the socket housing was pushed up to the stop.

### Note

*For safety reasons, check the connector for secure catch by tightening it in the opposite direction.*





## 3 Activated charcoal filter system

### 3.1 Summary of components



#### Note

- ◆ The hose connections are secured with spring strap clips or clamp-type clips.
- ◆ Renew clamp-type clips with spring-type clips.
- ◆ Use pliers for spring strap clips to fit the spring strap clips.
- ◆ Safety precautions when working on the fuel supply system ⇒ [page 4](#) .
- ◆ Observe cleanliness requirements when working on the fuel system ⇒ [page 6](#) .

#### 1 - Activated charcoal filter

- ☐ Location: in right of engine compartment
- ☐ from 01.2005, with air admission fitting installed of sealing grommet (Pos. 9)

#### 2 - Pressure holding valve with connection hose

#### 3 - Connecting hose

- ☐ check for firm seating
- ☐ from fuel tank

#### 4 - 10 Nm

#### 5 - Activated charcoal filter solenoid valve 1 - N80-

- ☐ Valve closed when ignition is switched off
- ☐ valve is actuated (pulsed) by engine control unit when engine is warm

#### 6 - Connecting hose

- ☐ To intake manifold
- ☐ check for firm seating

#### 7 - Support

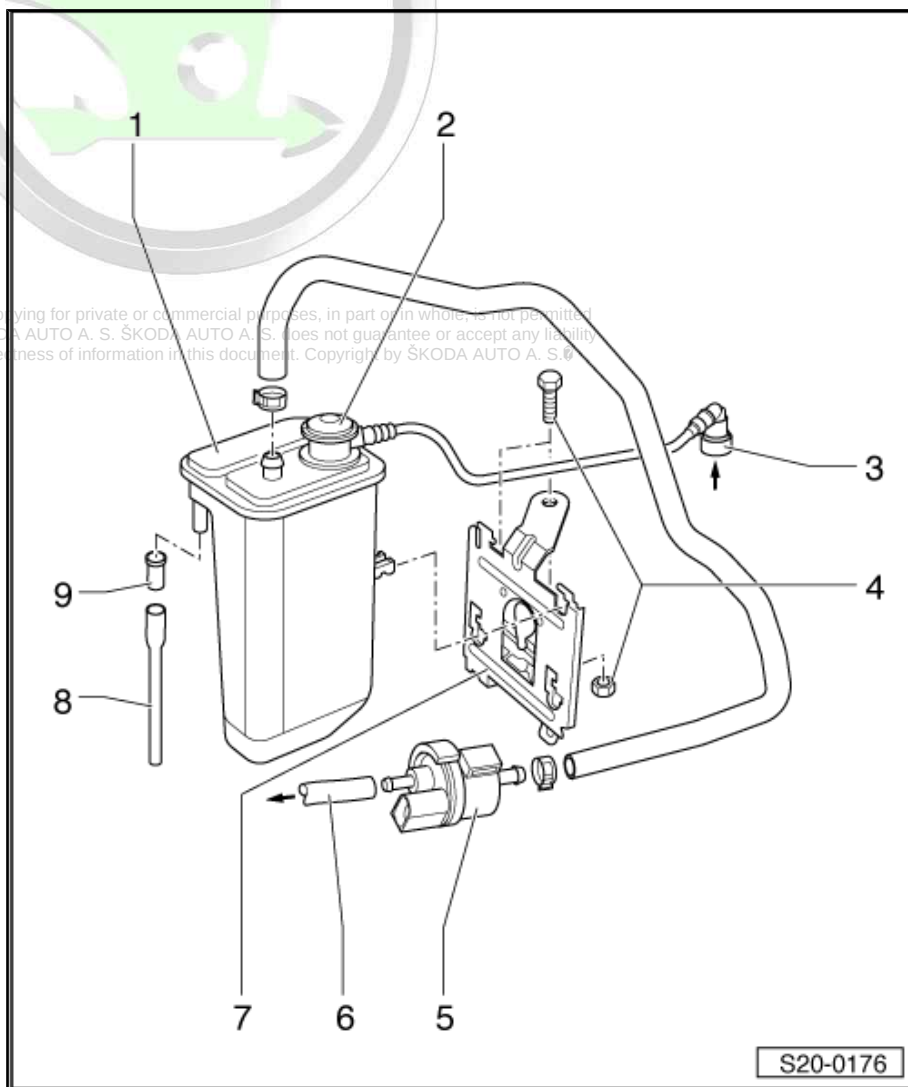
- ☐ for activated charcoal filter

#### 8 - Air admission hose

- ☐ up to 12.2004

#### 9 - Sealing grommet

- ☐ up to 12.2004



### 3.2 Checking the fuel tank venting

#### Special tools and workshop equipment required

- ◆ Hand vacuum pump , e.g. -VAS 6213-

- ◆ Adapter set , e.g. -V.A.G 1318/17A-
- ◆ Adapter , e.g. -V.A.G 1318/20-1-

**i Note**

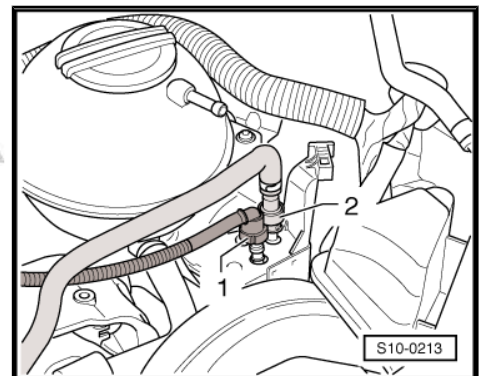
*The adapter set - V.A.G 1318/17A- replaces the adapter set - V.A.G 1318/17-.*

**Test condition**

- The ignition must be switched off.

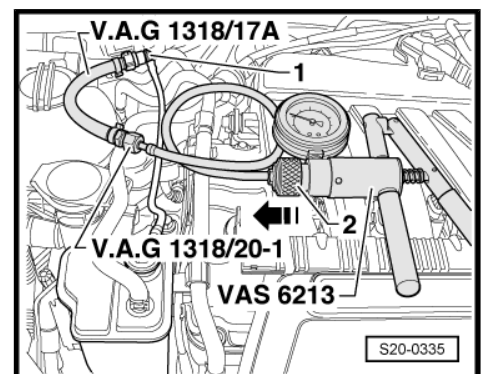
**Test sequence**

- Detach vent line -1-. To do so press in the securing ring.



- Connect the hand vacuum pump - VAS 6213- to the vent line -1- as shown in the illustration.
- Slide the sliding ring -2- of the hand vacuum pump - VAS 6213- in the -direction of arrow- for "vacuum".
- Operate hand vacuum pump - VAS 6213- several times.
- No vacuum should build up.

If a vacuum builds up.



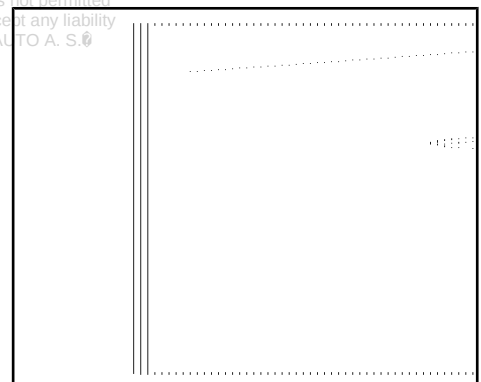
- Check breather hose or air admission fitting -arrow- on the activated charcoal filter for contamination and clean if necessary.

If no vacuum builds up:

- Shut off breather hose or air admission fitting -arrow- and once again operate the vacuum pump several times.
- A vacuum should build up.

If no vacuum builds up:

- Replace activated charcoal filter.





## 21 – Turbocharging/supercharging

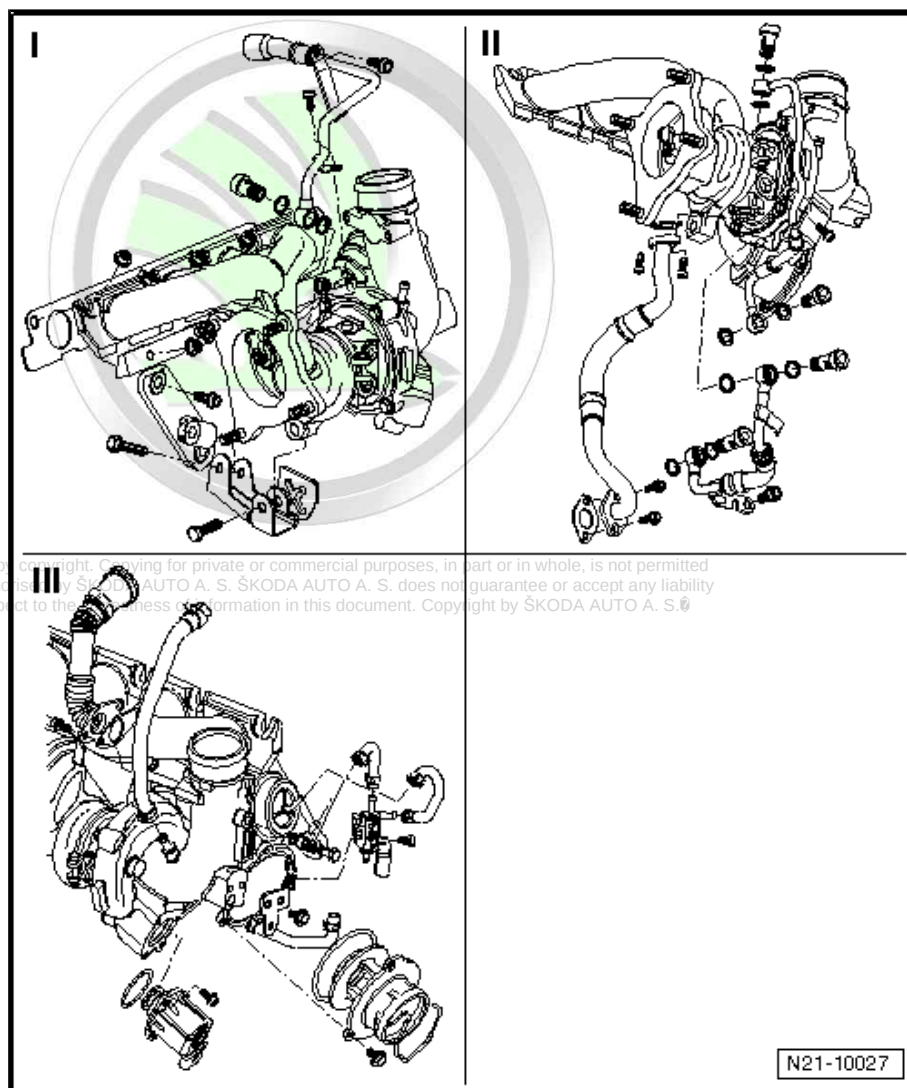
### 1 Exhaust gas turbocharger



#### Note

Observe the general notes for assembly work on the charge air system with exhaust gas turbocharger ⇒ [page 8](#).

#### 1.1 Exhaust turbocharger - Summary of components



Part I ⇒ [page 197](#)

Part II ⇒ [page 198](#)

Part III ⇒ [page 199](#)

## 1.1.1 Part I

### 1 - Gasket

- ☐ replace

### 2 - 20 Nm

- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

### 3 - 35 Nm

### 4 - Sealing ring

- ☐ replace

### 5 - 9 Nm

### 6 - Coolant return-flow line

### 7 - Exhaust gas turbocharger

- ☐ removing and installing  
⇒ [page 201](#)

### 8 - Support

### 9 - 30 Nm

- ☐ Wet screw with hot bolt paste - G 052 112 A3-

### 10 - 30 Nm

- ☐ Wet screw with hot bolt paste - G 052 112 A3-

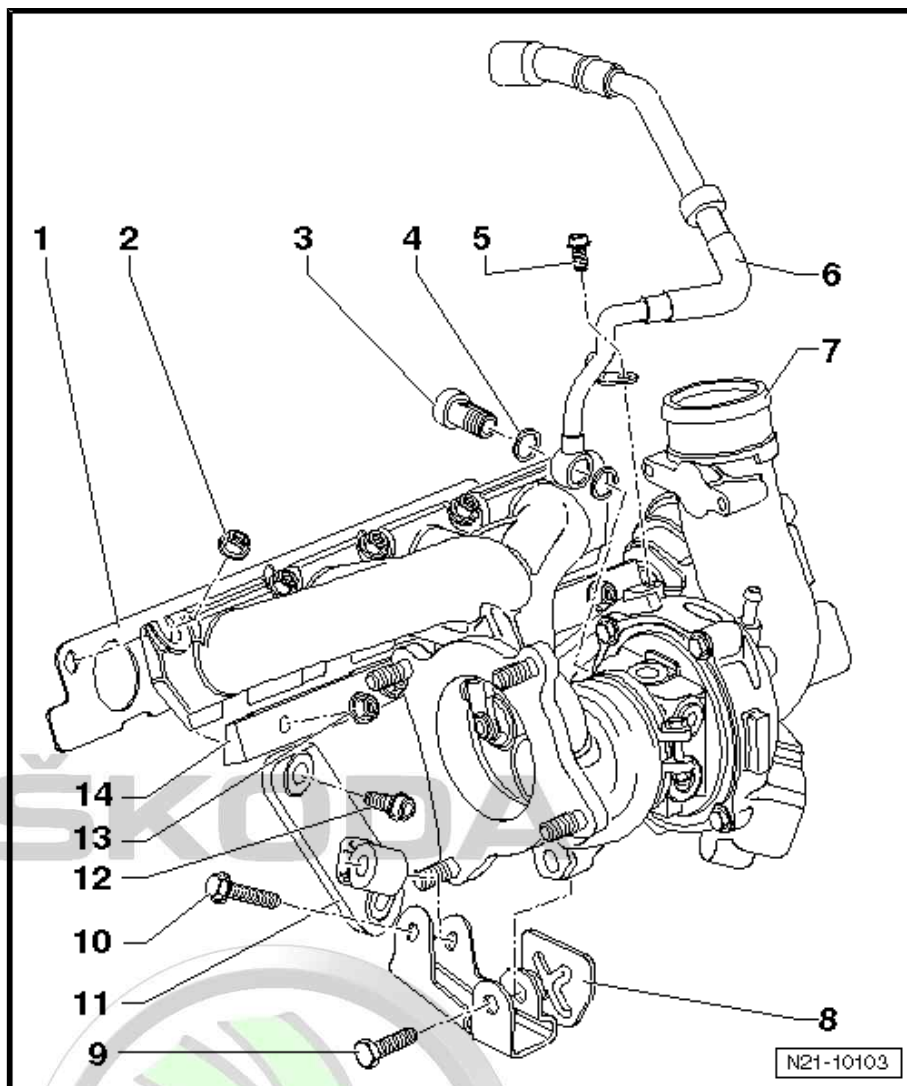
### 11 - Support

### 12 - 23 Nm

### 13 - 30 Nm

- ☐ do not remove for removing the turbocharger
- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

### 14 - Terminal strip







## 1.1.2 Part II

### 1 - Sealing ring

- ☐ replace

### 2 - 30 Nm

### 3 - Oil feed line

- ☐ with heat protection sleeve

### 4 - Exhaust gas turbocharger

- ☐ removing and installing  
⇒ [page 201](#)

### 5 - 9 Nm

### 6 - 30 Nm

### 7 - Sealing ring

- ☐ replace

### 8 - 35 Nm

### 9 - Sealing ring

- ☐ replace

### 10 - Coolant feed line

### 11 - 23 Nm

### 12 - 35 Nm

### 13 - 9 Nm

### 14 - Sealing ring

- ☐ replace

### 15 - Gasket

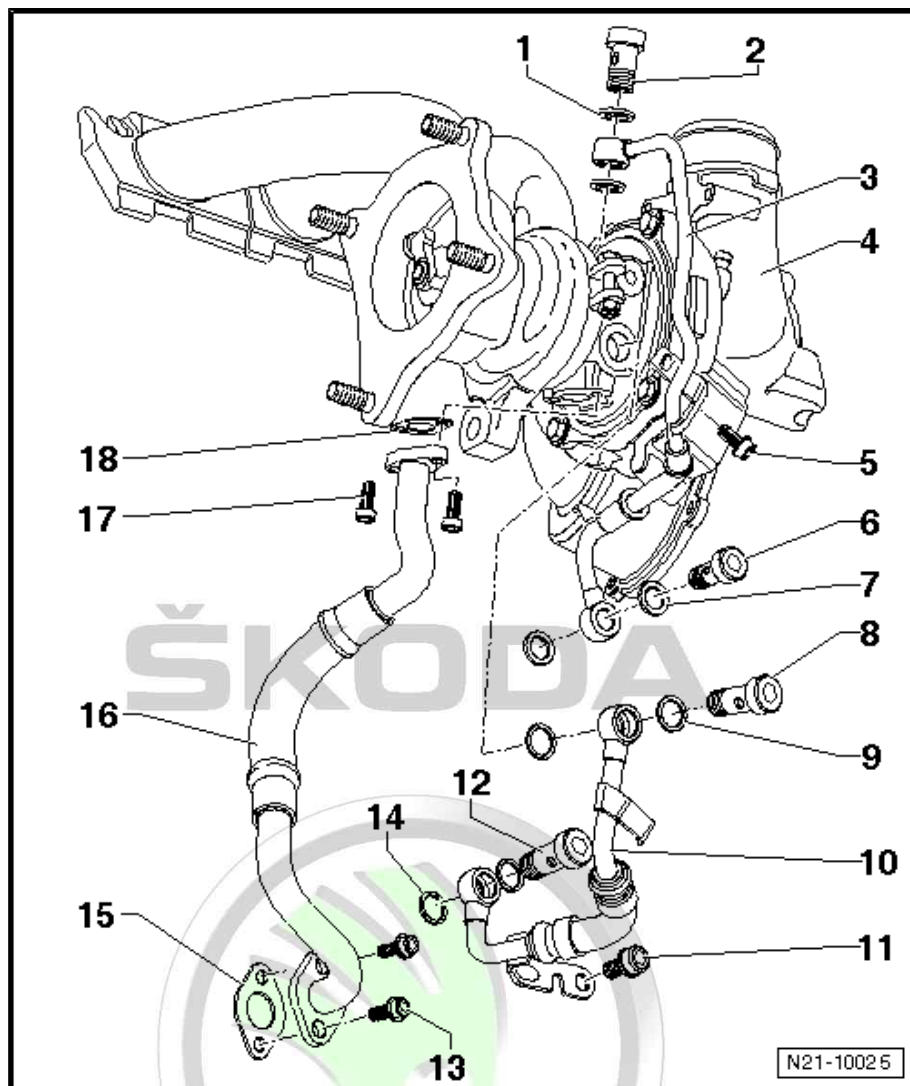
- ☐ replace

### 16 - Oil return-flow line

### 17 - 9 Nm

### 18 - Gasket

- ☐ replace



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### 1.1.3 Part III

#### 1 - Exhaust gas turbocharger

- ☐ removing and installing  
⇒ [page 201](#)

#### 2 - Gasket

- ☐ replace

#### 3 - 9 Nm

#### 4 - Crankcase ventilation line

#### 5 - Protection plate

#### 6 - Connecting hose

- ☐ with heat protection sleeve

#### 7 - Vacuum unit

- ☐ check ⇒ [page 200](#)
- ☐ removing and installing  
⇒ [page 209](#)
- ☐ adjust ⇒ [page 210](#)

#### 8 - Connecting piece

#### 9 - Sealing ring

- ☐ replace

#### 10 - Hose

#### 11 - Hose

#### 12 - 3 Nm

#### 13 - Solenoid valve for charge pressure control - N75 -

#### 14 - 8 Nm

#### 15 - Sealing ring

- ☐ replace

#### 16 - Supports

#### 17 - Locking clip

#### 18 - 7 Nm

#### 19 - Hose

#### 20 - 7 Nm

#### 21 - Support

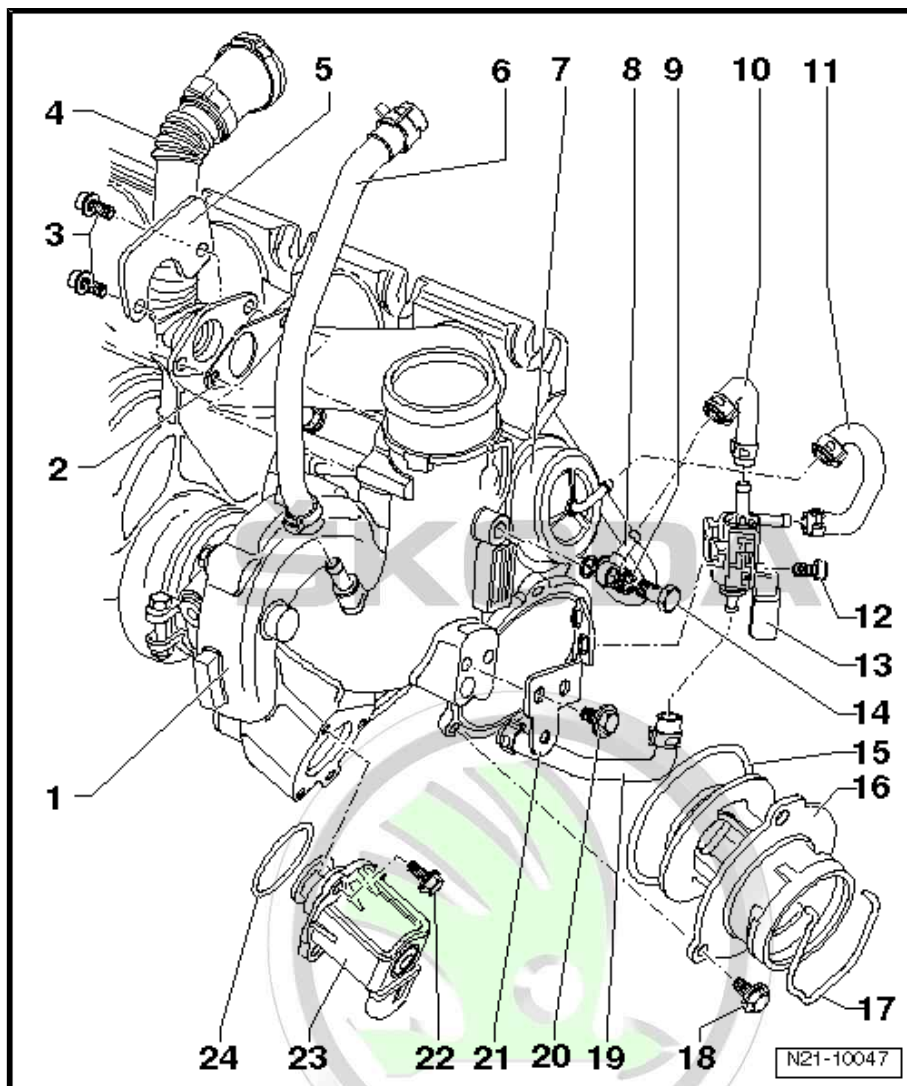
#### 22 - 7 Nm

#### 23 - Turbocharger divert air valve - N249-

- ☐ Note installation position ⇒ [page 200](#)

#### 24 - Sealing ring

- ☐ replace

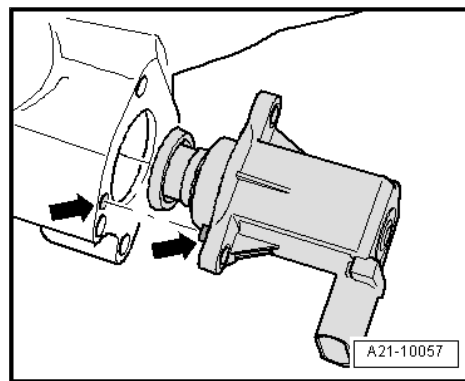


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### Fitting position turbocharger divert air valve - N249-

- Note fitting position -arrows-.

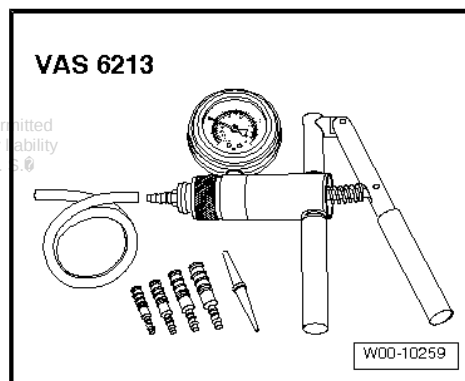


## 1.2 Testing exhaust turbocharger pressure box

### Special tools and workshop equipment required

- ♦ Manual vacuum pump - VAS 6213-

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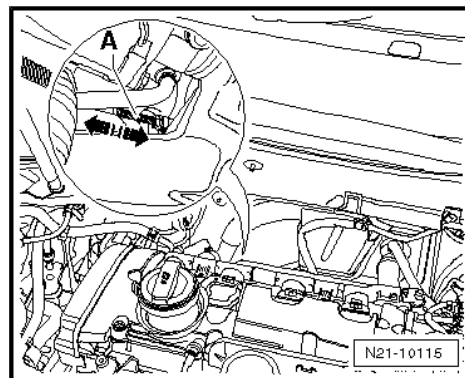
### Test conditions

- Engine oil temperature at least 60 °C.
- The hose from the exhaust gas turbocharger via the solenoid valve for charge pressure control - N75- to the pressure box must have continuity.
- Solenoid valve for charge pressure control - N75- OK
- The exhaust system must be leak-tight.

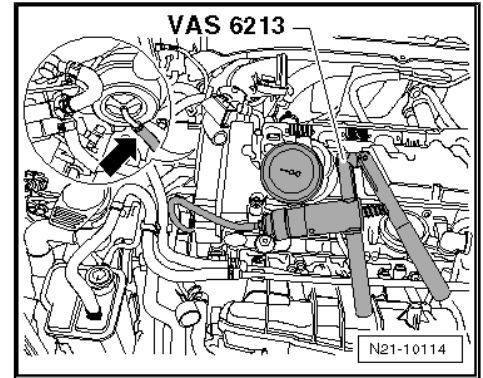
### Work procedure

- Remove engine cover ➔ [page 242](#) .
- Switch the engine on. With a mirror, observe the operating rod -A- of the pressure box on the turbocharger.
- Now bring the engine with a second mechanic up to high revolutions by spontaneously pressing on the accelerator pedal.
- The linkage -A- should now move.

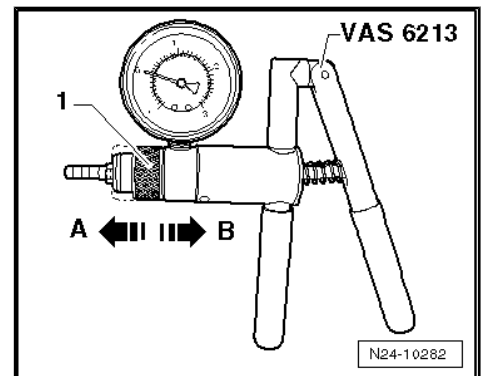
If the linkage does not move:



- Connect the hand vacuum pump - VAS 6213- to the pressure box -arrow-.



- Put the switch ring -1- of the hand vacuum pump - VAS 6213- to position -B- for “pressure”.
- Operate the hand vacuum pump - VAS 6213- several times and observe the linkage.

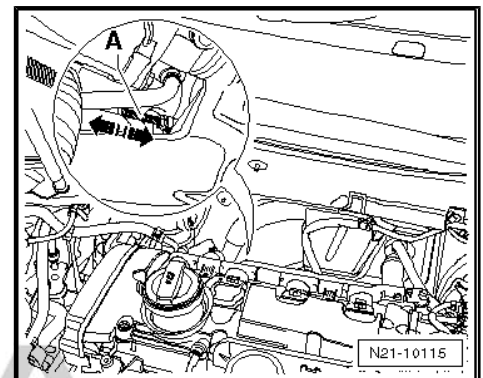


- The linkage -A- should now move slowly and stop at the end stop at approx. 0.070 MPa (700 mbar).



#### Note

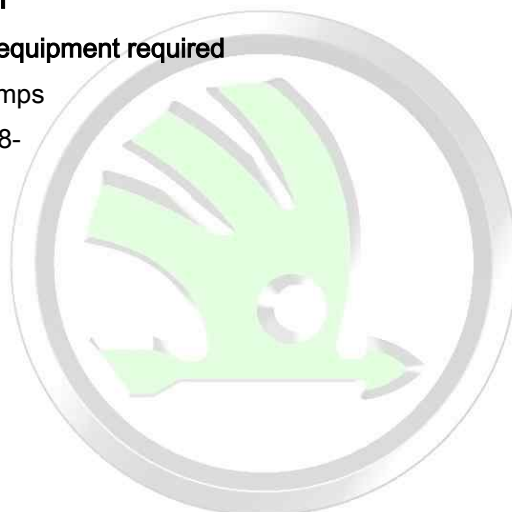
- ◆ If it is not possible to build up pressure using the hand vacuum pump - VAS 6213- or the vacuum drops immediately: Replace pressure box ➔ [page 209](#).
- ◆ If the pressure box is OK but the linkage -A- still does not move: Inspect the lever for the bypass valve for smooth operation. If the lever is sluggish or blocked: Replace exhaust turbocharger ➔ [page 201](#).



## 1.3 Removing and installing exhaust gas turbocharger

### Special tools and workshop equipment required

- ◆ Pliers for spring strap clamps
- ◆ Tensioning strap - T10038-





### Caution

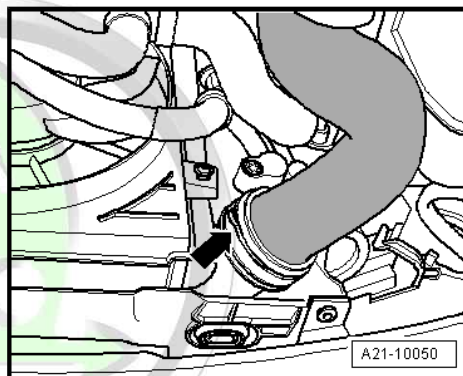
*In case a mechanical damage to the exhaust gas turbocharger is found, e.g. damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:*

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Inspect the air filter housing, the air filter element and the intake hoses for contaminations.*
- ◆ *Inspect the whole charge-air routing and the charge air cooler for foreign bodies.*

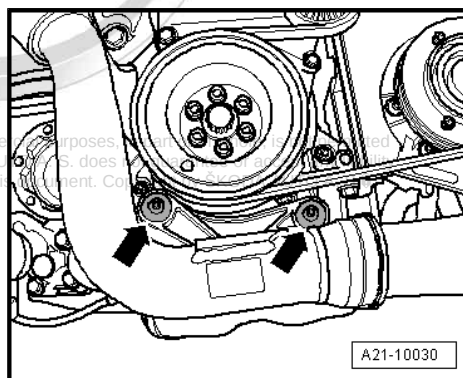
*If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.*

### Removing

- Remove engine cover ➔ [page 242](#) .
- Drain coolant ➔ [page 149](#) .
- Remove the front part of the front right wheelhouse liner ➔ Body Work; Rep. gr. 66 .
- Detach air guide hose -arrow- from charge air cooler.



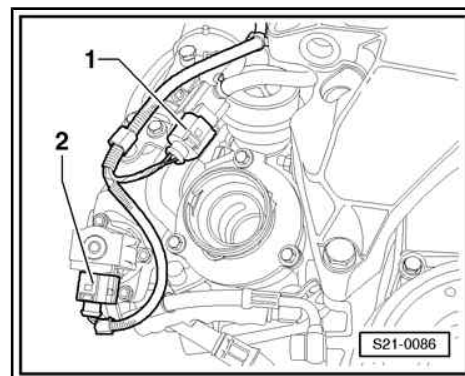
- Unscrew the bolts -arrows-, disconnect the top quick coupler and remove the charge air pipe.



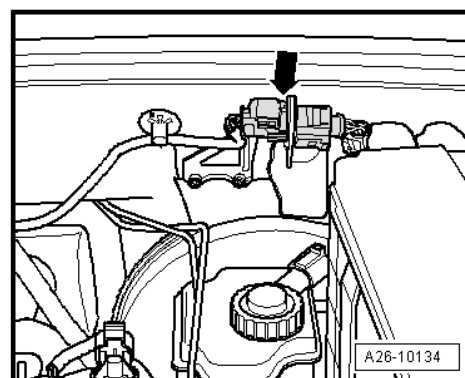
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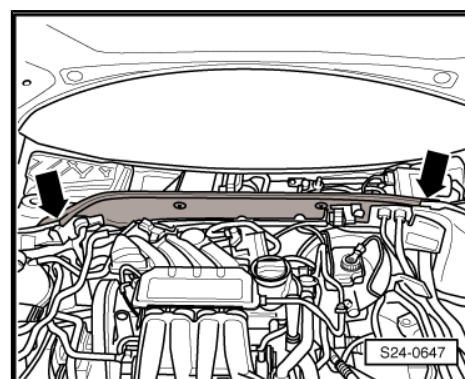
- Disconnect plug connections -1- and -2-.



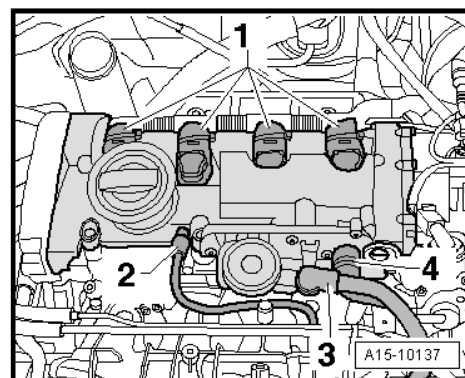
- Take plug connection -arrow- for lambda probe upstream of catalytic converter out of the holder, disconnect and move wiring loom clear.
- Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .



- Remove bulkhead plenum chamber.

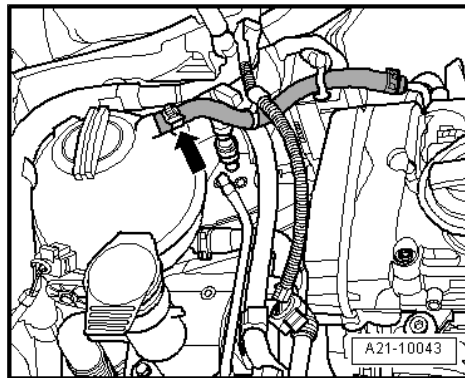


- Disconnect the plugs -1- from the ignition coils and place the wiring harness to one side.

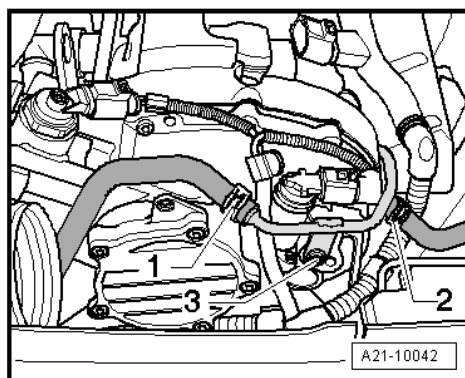




- Disconnect the coolant line -arrow- to the expansion reservoir.

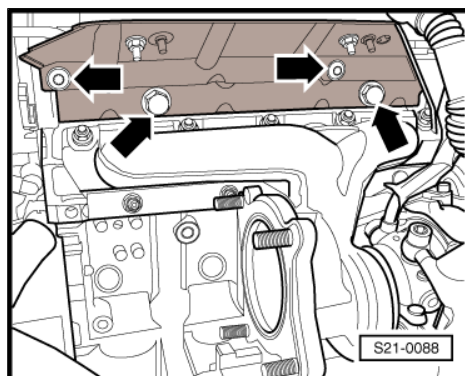
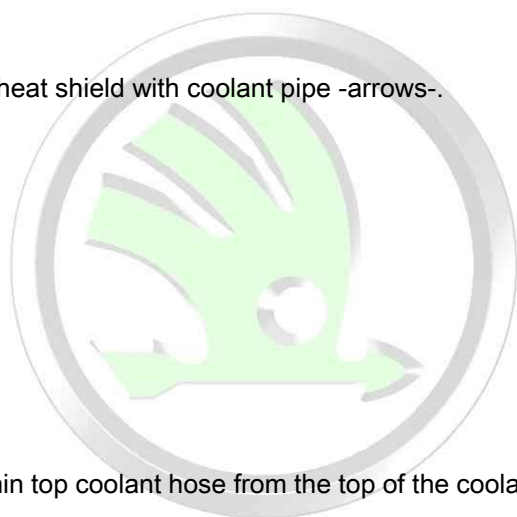


- Detach coolant hoses -1- and -2-.
- Unbolt the coolant line -3-.

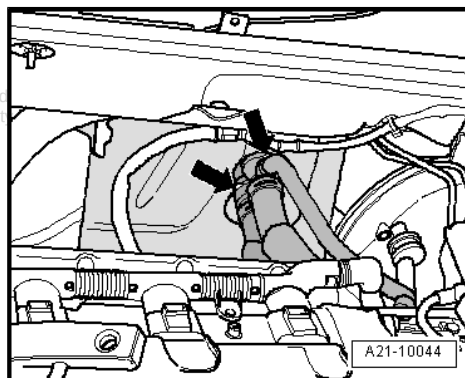


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- Remove heat shield with coolant pipe -arrows-.

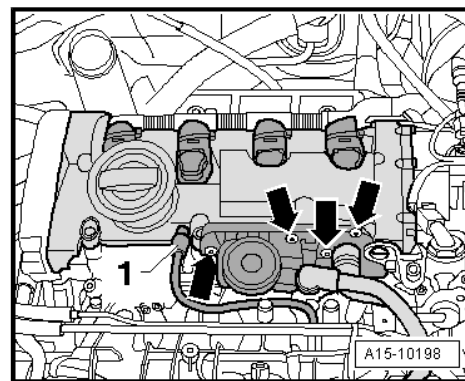


- Detach thin top coolant hose from the top of the coolant hose -arrow-.

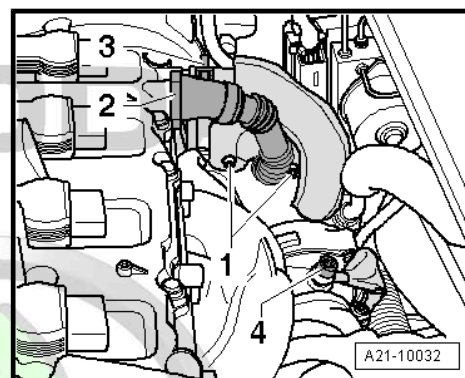


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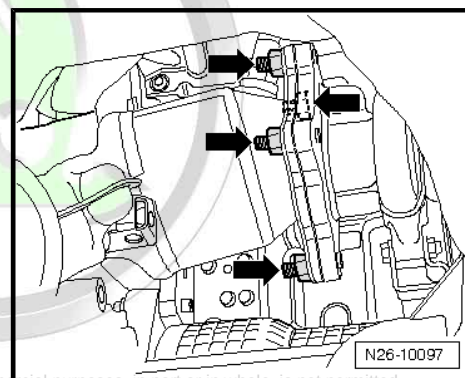
- Remove the valve body from the cylinder head cover -arrows-.



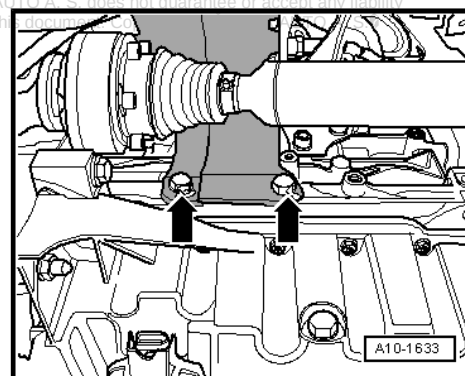
- Remove bolts -1- of the line for the crankcase ventilation from the exhaust gas turbocharger.
- Open clamp -2-. Detach the line for the crankcase ventilation from the cylinder head cover and remove.
- Detach activated charcoal filter line -3- to the exhaust gas turbocharger from cylinder head cover.
- Remove oil feed line -4- from the exhaust gas turbocharger.



- Unscrew the two top securing nuts -arrows- of the front part of the exhaust system/exhaust gas turbocharger.



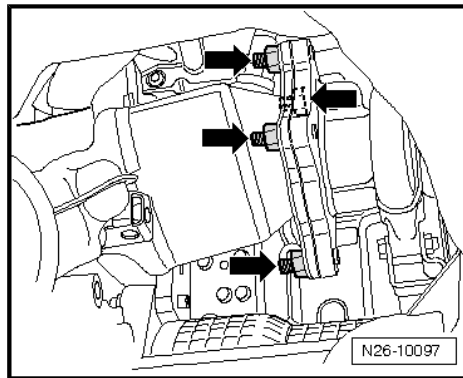
- Unbolt heat shield for right drive shaft -arrows-.



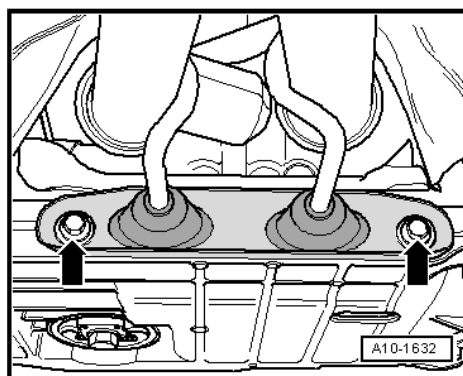
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- Unscrew the two bottom securing nuts -arrows- of the front part of the exhaust system/exhaust gas turbocharger.



- Unbolt mounting for exhaust system -arrows-.

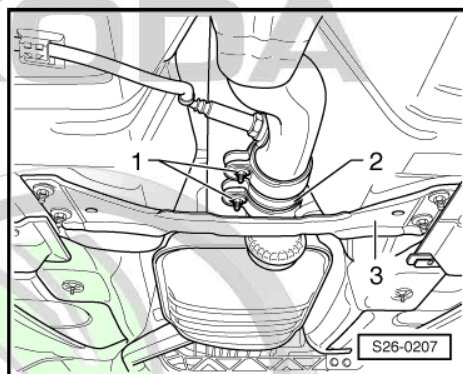


- Separate exhaust system at the clamping sleeve -arrow-.
- Pull off the front part of the exhaust system and slide backwards slightly.

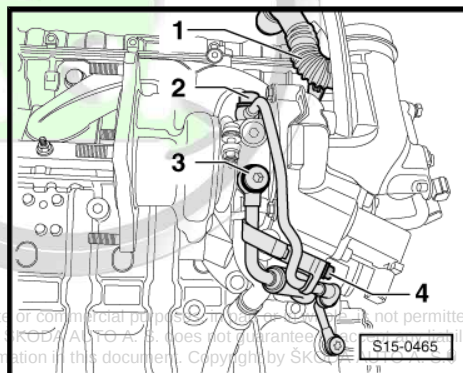


**Note**

*The front part of the exhaust system is not removed and the lambda probe plug is not disconnected.*

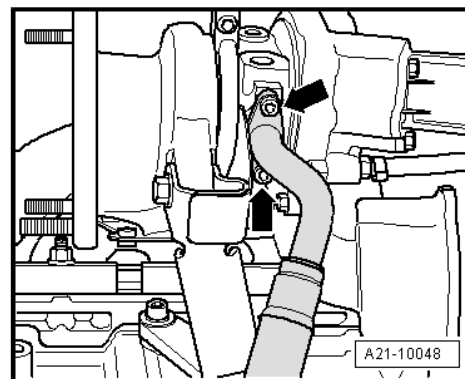


- Remove pipe -1-.
- Unscrew bolts -3- and -4- of the coolant supply line.



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- Detach the oil return line -arrows- from the exhaust gas turbocharger.

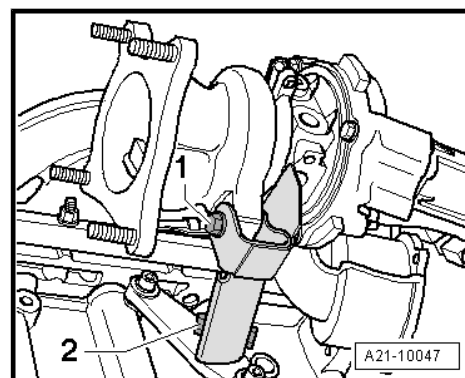


- Release screws -1- and -2- and remove the support for turbocharger.

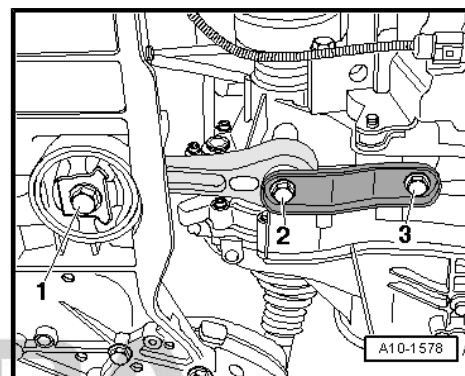


**Note**

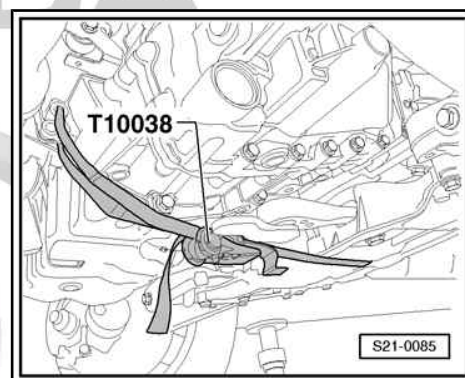
*The following steps are necessary to provide a little more space between cylinder head and bulkhead.*



- Unscrew screws -2- and -3-.



- Pull engine with the tensioning strap - T10038- up to the steering gear.





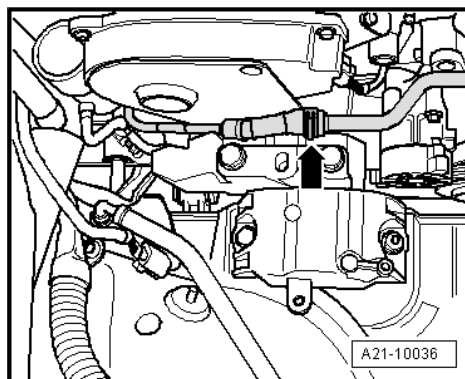


- Disconnect coolant pipe -arrow-.

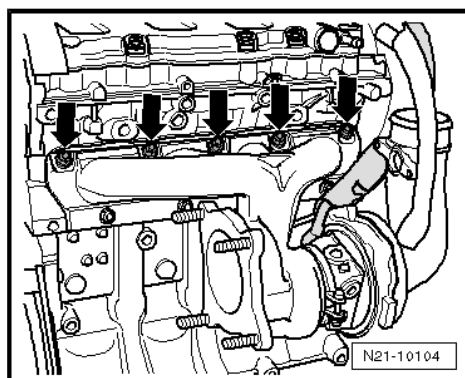


### Note

*The nuts of the clamping plate do not have to be loosened.*



- Unscrew the nuts -arrows-.



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- Remove the exhaust gas turbocharger/exhaust manifold -2- between the coolant hoses -3- and the cylinder head cover -1- at angle to top left.

#### Install

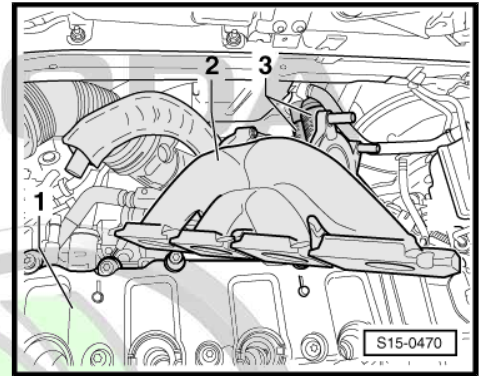


#### Caution

*In case a mechanical damage to the exhaust gas turbocharger is found, e.g. damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:*

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Inspect the air filter housing, the air filter element and the intake hoses for contaminations.*
- ◆ *Inspect the whole charge-air routing and the charge air cooler for foreign bodies.*

*If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.*



Installation is carried out in the reverse sequence. Pay attention to the following:

- ◆ Gaskets, sealing rings and self-locking nuts must be replaced.
- ◆ Fill the exhaust turbocharger with engine oil at the connection fitting for the oil feed line.
- ◆ After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the exhaust turbocharger.
- ◆ The coolant return-flow line ( ⇒ [page 197](#) , Pos. 6) must be installed with the turbocharger.
- ◆ Hose connections and hoses for charge air system must be free of oil and grease before assembly. Only gaskets and sealing surfaces of the push-fit couplings are coated with oil ⇒ [page 216](#) .
- ◆ Secure all hose connections with hose clamps ⇒ Electronic Catalogue of Original Parts .
- ◆ Observe the assembly instruction for hose connections with push-fit couplings ⇒ [page 216](#) .
- Install exhaust system and align free of stress ⇒ [page 289](#) .
- Install pendulum support ⇒ [page 31](#) .
- Top up coolant ⇒ [page 149](#) .

Tightening torques ⇒ [page 196](#) .

## 1.4 Removing and installing the exhaust gas turbocharger pressure box

### Removing

- Remove exhaust turbocharger ⇒ [page 201](#) .
- Secure the lock washer above the linkage of the pressure box on the exhaust gas turbocharger.

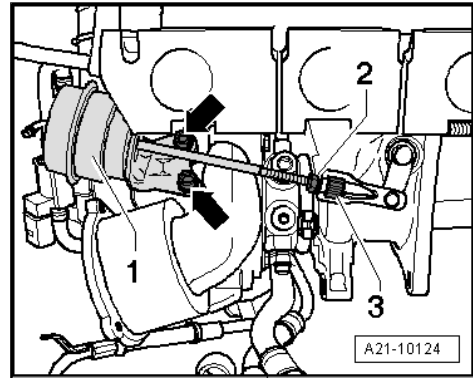


- Loosen locknut -2-.
- Disconnect the linkage from the turbocharger -3-.
- Detach the pressure box -arrows- from the exhaust gas turbocharger.

### Install

Installation is carried out in the reverse order. When installing, observe the following:

- Fit the pressure box -1- to the exhaust gas turbocharger with torque of 10 Nm -arrows-.
- Inserting exhaust gas turbocharger pressure box  
⇒ [page 210](#) .
- The lock nut of the linkage must be secured with sealing wax  
⇒ Electronic Catalogue of Original Parts .
- Install exhaust turbocharger ⇒ [page 201](#) .



## 1.5 Adjusting exhaust turbocharger pressure box

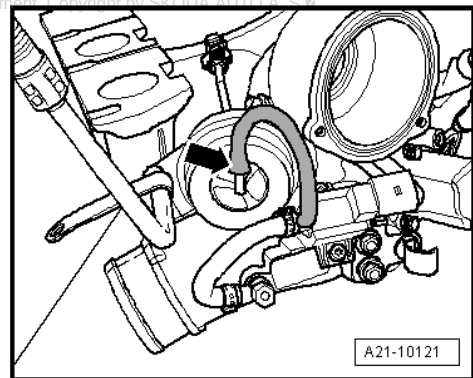
### Special tools and workshop equipment required

- ◆ Universal dial gauge holder - MP3-447 (VW 387)-
- ◆ Hand vacuum pump , e.g. -VAS 6213-
- ◆ Pressure control valve , e.g. -VAS 6342-
- ◆ Turbocharger tester , e.g. - V.A.G 1397 A-
- ◆ Dial gauge , e.g. -VAS 6341/1-
- ◆ Extension, 30 mm , e.g. -VAS 6341/3-
- ◆ Flat button , e.g. -VAS 6341/4-



### Note

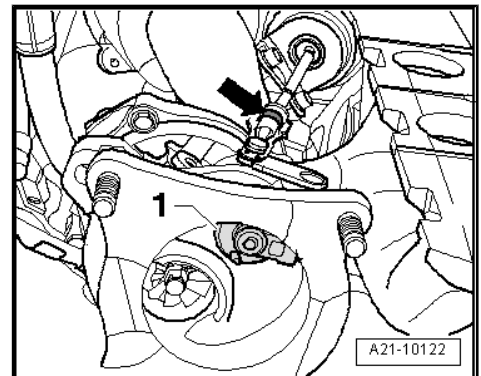
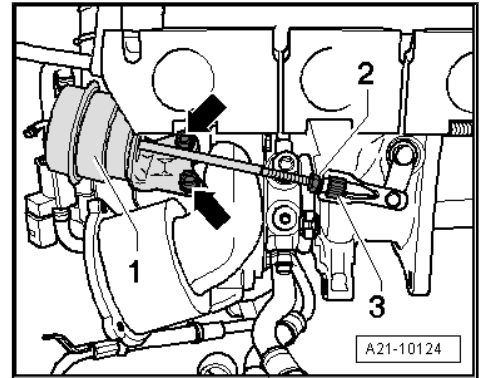
- ◆ *The pressure box must only be set when the linkage was undone.*
- ◆ *This setting is made when the turbocharger is removed.*
- Remove exhaust turbocharger ⇒ [page 201](#) .
- Remove the hose -arrow- from the pressure box on the turbocharger.
- Secure the lock washer above the linkage of the pressure box on the exhaust gas turbocharger.



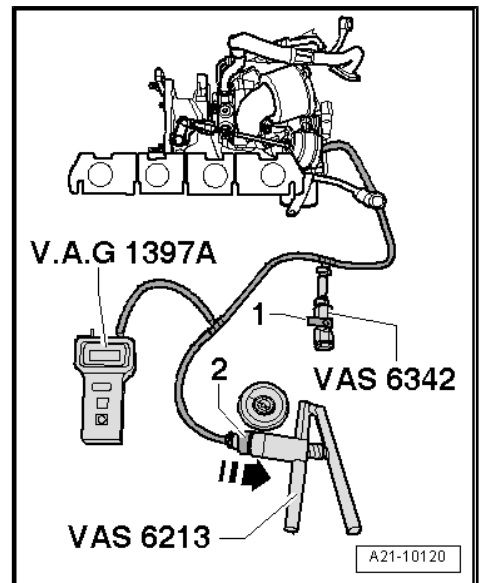
- Loosen locknut -2-.

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- Pre-set the bypass valve -1- via the linkage of the pressure box -arrow- so that the bypass valve can still just about be rotated from its position with the hand.
- Tighten locknuts until hand-tight.

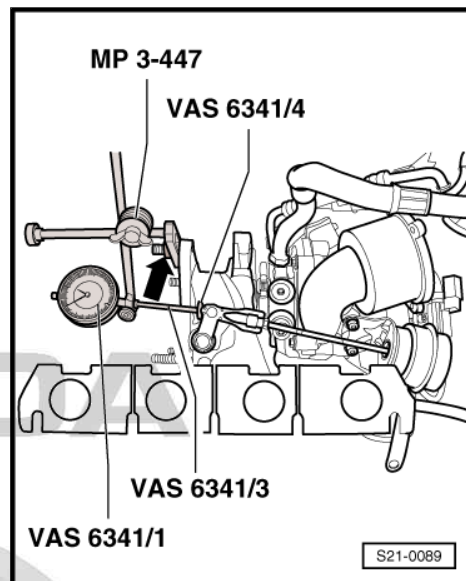


- Fit the hand vacuum pump - VAS 6213- , the turbocharger tester - V.A.G 1397 A- with connection II and the pressure relief valve - VAS 6342- together as shown in the figure.
- Connect the pressure relief valve - VAS 6342- to the lever -1-.
- Slide the switch ring -2- on the hand vacuum pump - VAS 6213- in -direction of arrow- up to the stop.
- Switch on the turbocharger tester - V.A.G 1397 A- and put the sliding switch into position II.





- Secure universal dial gauge bracket - MP3-447- to the exhaust gas turbocharger-arrow-.
- Secure the dial gauge - VAS 6341/1- with 30 mm extension piece - VAS 6341/3- and flat button - VAS 6341/4- to the universal dial gauge bracket - MP3-447- .
- At 0 MPa (0 bar), set the pretension on the dial gauge - VAS 6341/1- to 1 mm.
- Turn the indicator of the dial gauge - VAS 6341/1- to 0 (zero).
- Check the dial gauge for ease of movement.
- Operate the hand vacuum pump - VAS 6213- until the turbo-charger tester - V.A.G 1397 A- indicates  $0.035 \text{ MPa} \pm 0.0005 \text{ MPa}$  ( $0.35 \text{ bar} \pm 0.005 \text{ bar}$ ).
- The dial gauge should indicate  $4.1 \dots 4.3 \text{ mm}$ . If not, continue to turn the linkage of the pressure box until this value is indicated.
- Tighten locknuts until hand-tight.
- Repeat measurement.



#### Note

*The mm indications relate to the value that is read (contains a 1 mm pre-tension).*

- Reduce pressure via pressure control valve - VAS 6342- to 0 MPa (0 bar).
- Set the dial gauge - VAS 6341/1- to 0 (null).



#### Note

♦ *Observe the sequence of the following measurements.*

♦ *In between times, the pressure should not be relieved to 0 MPa (0 bar).*

- Press the hand vacuum pump - VAS 6213- until the turbo-charger tester - V.A.G 1397 A- indicates  $0.035 \text{ MPa} \pm 0.0005 \text{ MPa}$  ( $350 \text{ mbar} \pm 5 \text{ mbar}$ ).
- Read the value on the dial gauge - VAS 6341/1- (value 1) and note it down.
- Press the hand vacuum pump - VAS 6213- until the turbo-charger tester - V.A.G 1397 A- indicates  $0.065 \text{ MPa}$   $0.070 \text{ MPa}$  ( $650 \text{ mbar}$  to  $700 \text{ mbar}$ ).
- Reduce pressure via pressure control valve - VAS 6342- to  $0.035 \text{ MPa} \pm 0.0005 \text{ MPa}$  ( $350 \text{ mbar} \pm 5 \text{ mbar}$ ).
- Read the value on the dial gauge - VAS 6341/1- (value 2) and note it down.
- Add values 1 and 2 together and divide by 2.
- The result (mean) must be  $5 \pm 0.25 \text{ mm}$ .

If the result (mean) is not  $5 \pm 0.25 \text{ mm}$ .

- Correct the setting, tighten the locknut until hand-tight, and repeat the measurement.

If the result (mean) is  $5 \pm 0.25 \text{ mm}$ .



- Tighten the lock nut to 5 Nm and secure with sealing wax ⇒  
Electronic Catalogue of Original Parts .
- Secure the lock washer above the linkage of the pressure box  
on the exhaust gas turbocharger. Make sure that the lock  
washer is fastened securely.

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## 2 Charge air system with exhaust gas turbocharger

- Observe the general notes for assembly work on the charge air system with exhaust gas turbocharger ➔ [page 8](#) .

### 2.1 Summary of components - charge air cooler

1 - 7 Nm

2 - Bearings

- ☐ for charge air cooler

3 - Charge air cooler

- ☐ with top and bottom seal inserted
- ☐ removing and installing ➔ [page 214](#)

4 - Charge air pipe

5 - 8 Nm

6 - from exhaust turbocharger

7 - Charge air hose

8 - to throttle valve control unit  
- J338-

9 - Clamp

10 - Charge air hose

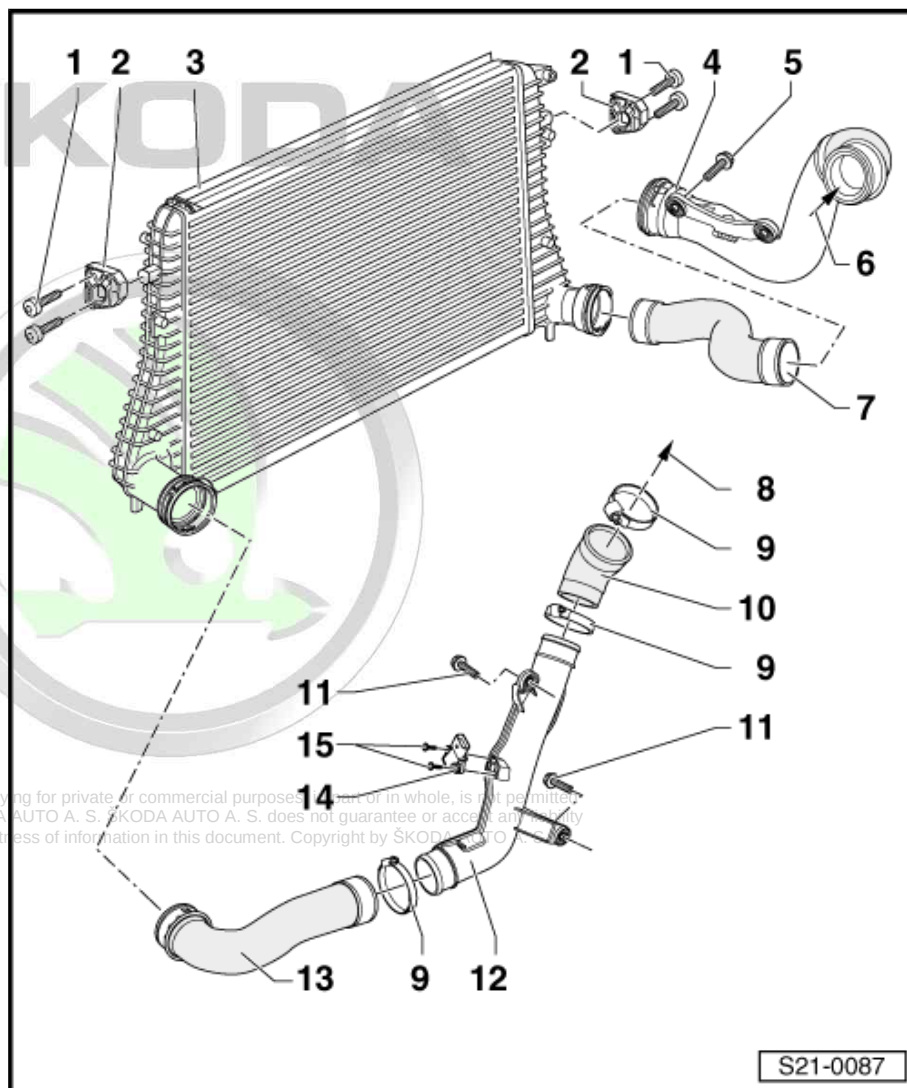
11 - 8 Nm

12 - Charge air pipe

13 - Charge air hose

14 - Charge pressure sender  
G31-

15 - 5 Nm



### 2.2 Removing and installing charge air cooler

#### Removing

- Removing radiator ➔ [page 160](#) .

- Detach the left and right charge air hoses -arrows- from the charge air cooler.
- Unscrew fixing screws for charge air cooler left and right ( ➔ [page 214](#) , Pos. 1).



#### WARNING

*Do not open the refrigerant circuit of the air conditioning system.*



#### Caution

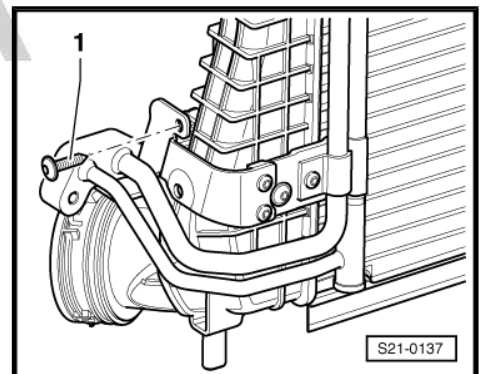
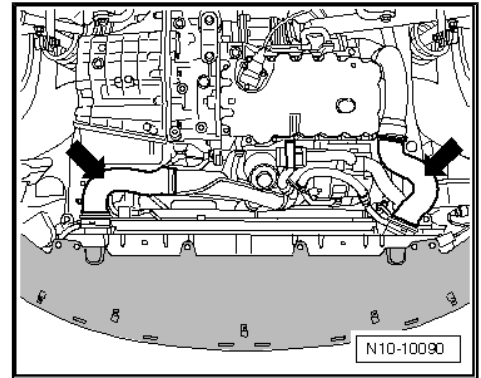
*In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.*



#### Note

*For the following operations a second mechanic is required to hold the charge air cooler.*

- Unhook the charge air cooler upwards out of the bottom mountings and swivel to the rear.
- Unscrew side bolt -1- at bottom right that fastens the coolant lines to the charge air cooler.

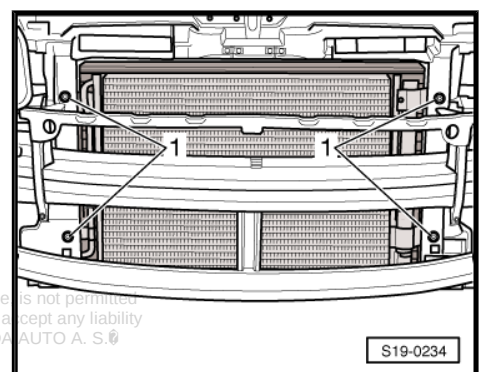


- Screw out the fixing screws -1- of the condenser.
- Remove charge air cooler downwards.

#### Install

Installation is carried out in the reverse order. When installing, observe the following:

- Observe the assembly instruction for hose connections with push-fit couplings ➔ [page 216](#) .



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## 2.3 Hose connections with push-fit couplings



### Caution

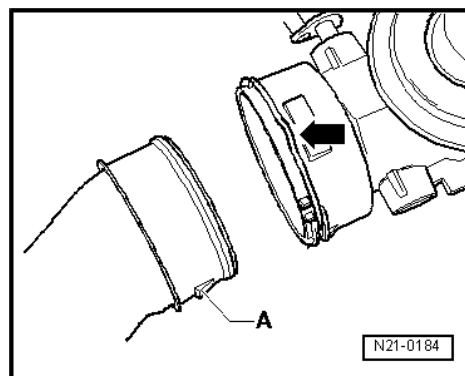
*The gasket ring for the push-fit coupling can be damaged, if the locking clip is in the lock position during the assembly. There would be a leak in the connection. Observe the assembly instruction.*

### Removing

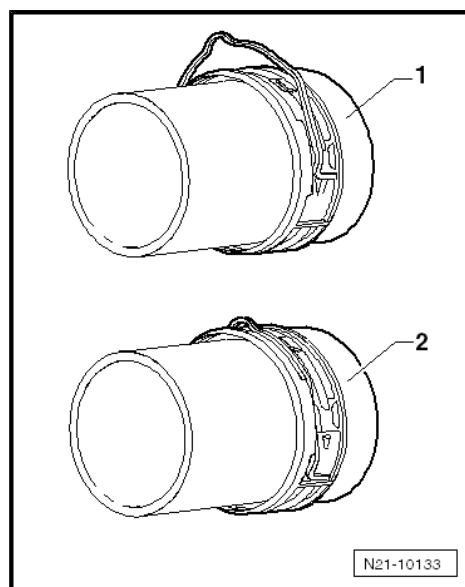
- Release push-fit coupling by pulling the locking clip -arrow-. Disconnect hose/pipe without auxiliary tool.

### Install

- When replacing the gasket ring, place the gasket ring in the groove of the charge air hose. Make sure that the gasket ring is fully seated all around in the groove and not twisted.
- Oil the sealing surface and the gasket ring.



- Put the securing clamp into the release position -1-.
- Insert the charge air hose up to the stop into the coupling.
- Put the locking clip into the lock position -2- and then press down once again the charge air hose.
- Check hose for tight connection by pulling on it and check the correct locking of the push-fit coupling.



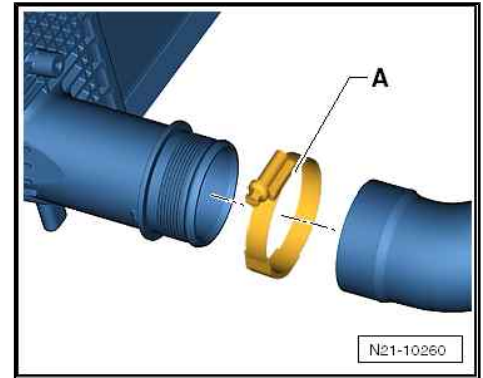
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## 2.4 Hose connections with screw clamps



### Note

- ◆ *Connections, charge air pipes and hoses of charge air system must be free of oil and grease before being installed.*
- ◆ *Only install approved screw clamps for securing the hose connections ⇒ Electronic Catalogue of Original Parts .*
- ◆ *In order to secure the charge air hoses on their connection fittings, the threads must be treated with rust solvent if the screw clamps have been used beforehand.*
- ◆ *After a repair, check all the charge air pipes, charge air hoses and vacuum lines for tight connection and leaktightness.*



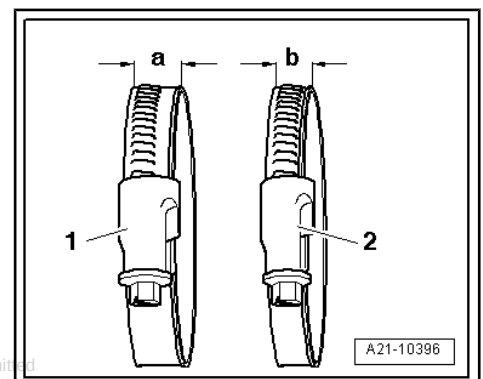
### Caution

*The screw clamps -A- on the charge air hoses must definitely be precisely tightened in accordance with the specifications ⇒ [page 217](#) .*

- ◆ *A too low or on the contrary, a too high tightening torque of the screw clamps, may result in the charge air hose slipping off the fluted pipe or the charge air pipe while driving.*

### Tightening torques of screw clamps

- 1 - Hose clamp -a- = 12 mm wide: 5.5 Nm
- 2 - Screw clamp -b- = 9 mm wide: 3 Nm



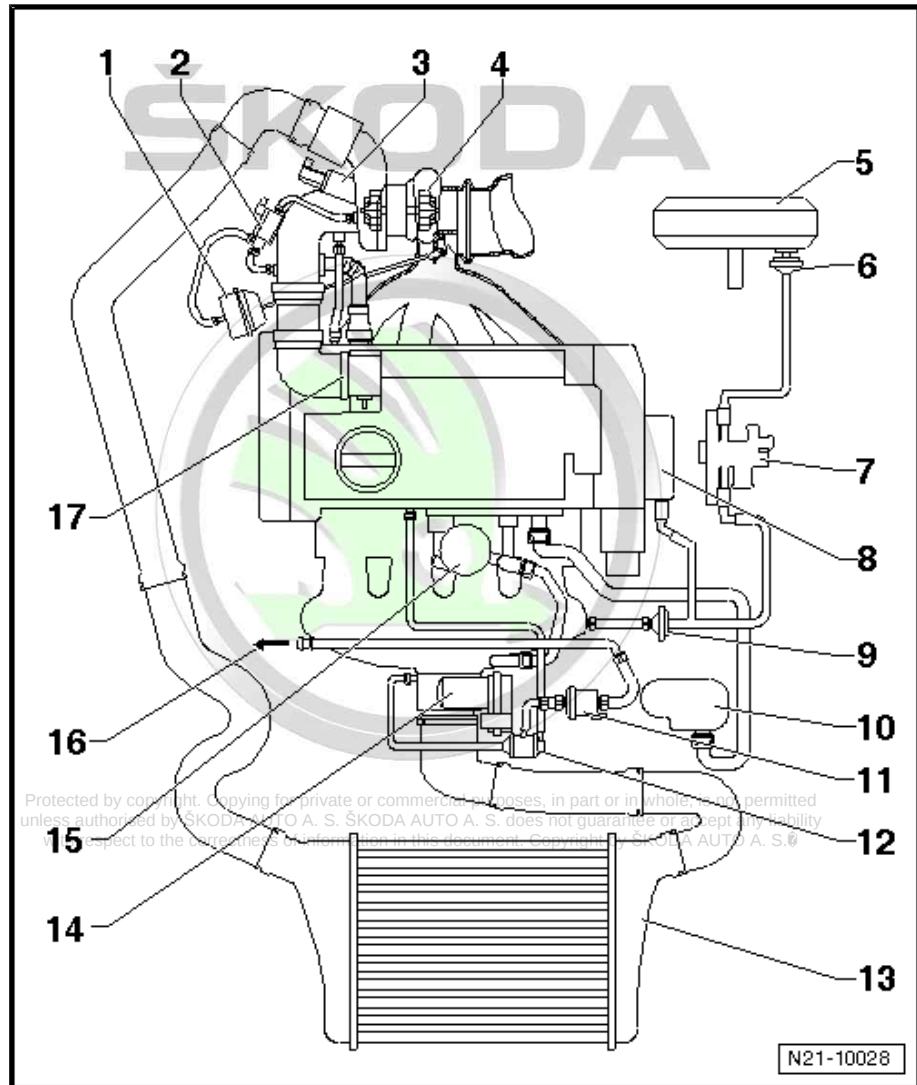
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## 2.5 Connection diagram for turbocharger charging





- 1 - Vacuum unit
- 2 - Solenoid valve for charge pressure control - N75 -
- 3 - Turbocharger divert air valve - N249-
- 4 - Exhaust gas turbocharger
- 5 - Brake servo unit
- 6 - Non-return valve
- 7 - Coolant flange
- 8 - Vacuum pump
- 9 - Non-return valve
- 10 - Oil filter holder
- 11 - Activated charcoal filter solenoid valve 1 - N80-
- 12 - Double non-return valve  
□ check ➔ [page 265](#)
- 13 - Charge air cooler
- 14 - Throttle valve module - J338-
- 15 - Pressure control valve
- 16 - to the activated charcoal filter system
- 17 - Air mass meter - G70-

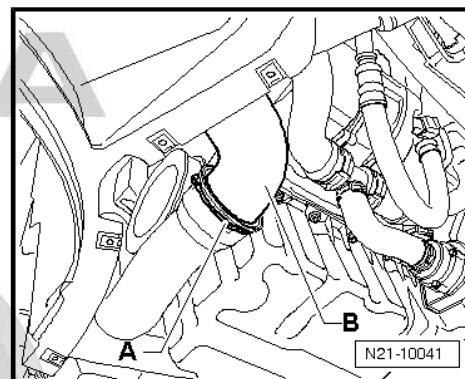


## 2.6 Checking the charge-air system for leaktightness

### Special tools and workshop equipment required

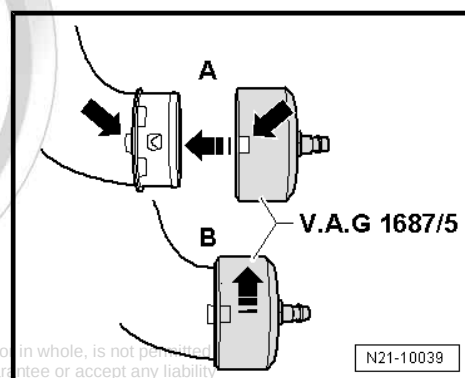
- ◆ Charge-air system testing device , e. g. -V.A.G 1687-
- ◆ Adapter , e.g. -V.A.G 1687/5-
- ◆ Ultrasonic tester , e.g. -V.A.G 1842-
- Remove the sound dampening system ➔ Body Work; Rep. gr. 50 .

- Undo the clasp -A- and remove the hose -B- from the charge-air pipe.



- Plug the adapter - V.A.G 1687/5- onto the charge air hose -A- and turn by approx. 90° -B-.

Prepare tester for charge air system - V.A.G 1687- as follows:

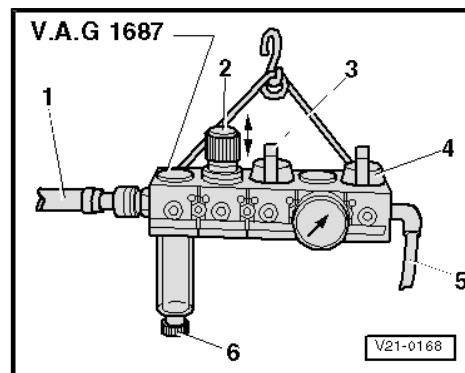


- Unscrew pressure control valve -2- fully and close the valves -3- and -4-.

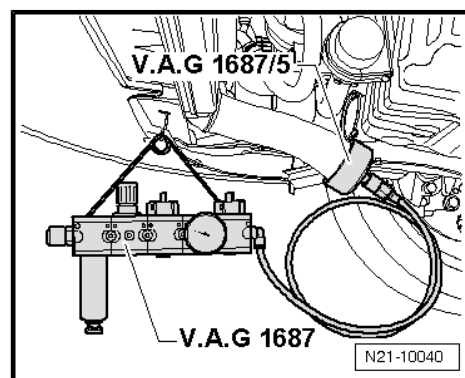


#### Note

*The rotary knob must be pulled to the top in order to rotate the pressure control valve -2-.*



- Connect the charge air system tester - V.A.G 1687- as shown.





- Connect the pneumatic hose -1- (pneumatic support) to tester for charge air systems - V.A.G 1687 - .



#### Note

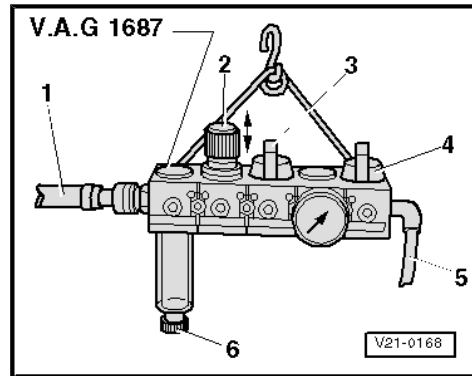
*If there is water in the inspection glass, drain water via the drain plug -6-.*

- Open valve -3-.
- Set the pressure to 0.05 MPa (0.5 bar) with the pressure control valve -2-.



#### Caution

***The pressure must not be greater than 0.05 MPa (0.5 bar)! A too high pressure can damage the engine.***



- Open valve -4- and wait until the test circuit is filled. If necessary regulate the pressure to 0.05 MPa (0.5 bar).
- Listen to, touch or use commercially available leak search spray or the ultrasonic measuring device - V.A.G 1842- to check the charge-air system for leak points.



#### Note

- ♦ *A small amount of air escapes via the valves into the engine. For this reason no pressure test is possible.*
- ♦ *Use of ultrasonic measuring device - V.A.G 1842 -> operating instructions .*
- ♦ *Before removing the adapter, depressurize the test circuit by detaching the coupling from the adapter - V.A.G 1687/5- .*
- ♦ *Hose connections and hoses for the charge air system must be free of oil and grease before being installed.*

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## 24 – Mixture preparation - injection

### 1 Installation locations of the injection system, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ:

#### 1.1 Summary of components

1 - Activated charcoal filter solenoid valve 1 - N80-

2 - Motronic control unit - J220-

- ☐ removing and installing  
⇒ [page 268](#)

3 - Exhaust gas recirculation valve - N18- with exhaust gas recirculation potentiometer - G212-

- ☐ Not installed for engine identification characters BLY, BVZ

4 - Inlet camshaft control valve 1 - N205-

5 - 6-pin connector

- ☐ for lambda probe - G39- and lambda probe heater - Z19- (black)
- ☐ for lambda probe 2 - G108- and lambda probe heater 2 - Z28- (brown), not installed for engine identification characters BLY, BVZ

6 - Coolant temperature sender - G62-

7 - Control valve for fuel pressure - N276-

8 - High pressure pump

- ☐ Summary of components and removing and installing ⇒ [page 233](#)

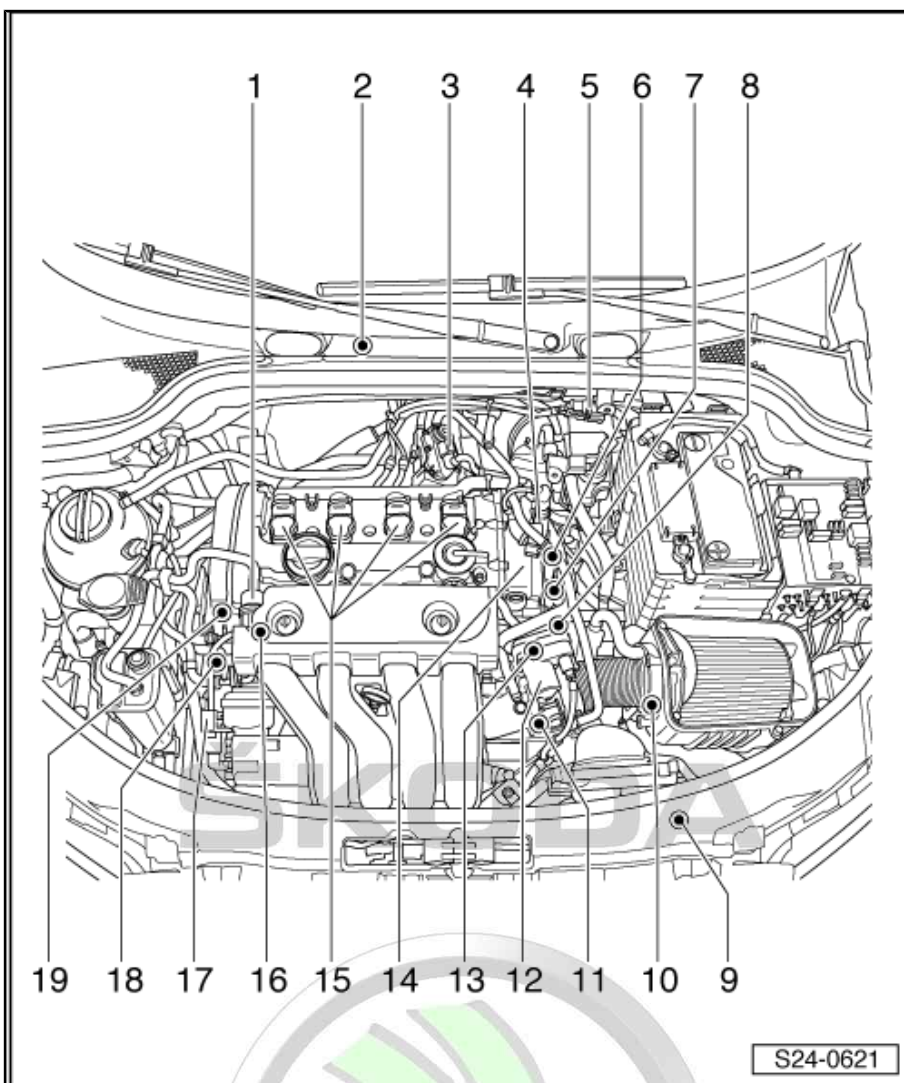
9 - Coolant temperature sender at radiator outlet - G83-

10 - Intake air temperature sender 2 - G299-

11 - Intake manifold pressure sender - G71- with intake air temperature sender - G42- .

12 - Throttle valve module - J338-

- ☐ with throttle valve drive for electronic power control - G186- , angle sensor 1 for throttle valve drive for electronic power control - G187- and angle sensor 2 for throttle valve drive for electronic power control - G188-
- ☐ after replacing, the engine control unit must be adapted ⇒ Vehicle diagnostic tester





**13 - 8-pin plug connection for injection valves**

**14 - Vacuum pump**

**15 - Ignition coils with a power output stage**

- ☐ Ignition coil 1 with output stage - N70-
- ☐ Ignition coil 2 with output stage - N127-
- ☐ Ignition coil 3 with output stage - N291-
- ☐ Ignition coil 4 with output stage - N292-

**16 - Fuel pressure sender - G247-**

**17 - Valve for variable intake manifold changeover - N156-**

**18 - Front right of engine (in direction of travel)**

- ☐ Fuel pressure sender for low-pressure - G410-
- ☐ Valve for variable intake manifold changeover - N156-
- ☐ 3-pin plug for engine speed sender - G28-
- ☐ Map-controlled engine cooling thermostat - F265-
- ☐ 3-pin plug for knock sensor 1 - G61-

**19 - Hall sender - G40-**



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## 2 Installation locations of the injection system, engine identification characters BWA

### 2.1 Summary of components

Components A to F are not shown in the illustration.

#### 1 - Solenoid valve for charge pressure control - N75-

- ☐ fitted directly onto the turbocharger  
⇒ [page 227](#)

#### 2 - Turbocharger divert air valve - N249-

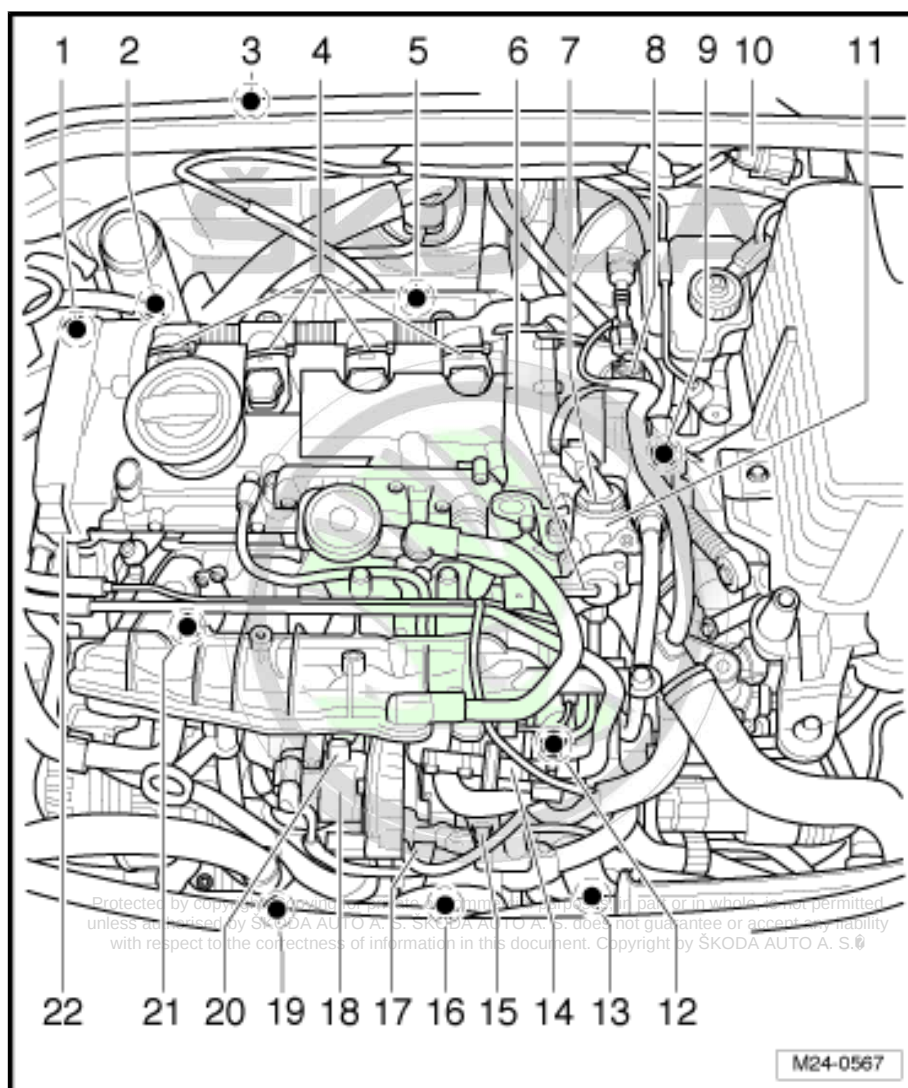
- ☐ fitted directly onto the turbocharger  
⇒ [page 227](#)

#### 3 - Motronic control unit - J220-

- ☐ removing and installing  
⇒ [page 268](#)

#### 4 - Ignition coils with a power output stage

- ☐ removing and installing  
⇒ [page 293](#)
- ☐ Ignition coil 1 with output stage - N70-
- ☐ Ignition coil 2 with output stage - N127-
- ☐ Ignition coil 3 with output stage - N291-
- ☐ Ignition coil 4 with output stage - N292-
- ☐ die ignition coils must be pulled out of the cylinder head using the puller -





T40039-

5 - lambda probe - G39- and heating for lambda probe - Z19-

6 - Fuel pressure sender for low-pressure - G410-

- ☐ Tightening torque: 15 Nm

7 - Control valve for fuel pressure - N276-

8 - Inlet camshaft control valve 1 - N205-

- ☐ removing and installing ⇒ [page 113](#)

9 - Coolant temperature sender - G62-

- ☐ ⇒ [page 225](#)

10 - 6-pin connector

- ☐ for lambda probe - G39- and lambda probe heater - Z19- (black) ⇒ [page 226](#)

11 - High pressure pump

- ☐ removing and installing ⇒ [page 262](#)

12 - Intake manifold flap motor - V157- with intake manifold flap potentiometer - G336-

- ☐ After replacing the fuel distributor, the intake manifold flap potentiometer - G336- must be adapted to the Motronic control unit - J220- again ⇒ Vehicle diagnostic tester.

13 - Engine speed sender - G28-

- ☐ ⇒ [page 226](#)

14 - Activated charcoal filter solenoid valve 1 - N80-

15 - Plug for Hall sender - G40- and fuel pressure sender - G247-

- ☐ ⇒ [page 227](#)

16 - Charge pressure sender - G31-

- ☐ ⇒ [page 227](#)

17 - Plug for injection valves

- ☐ ⇒ [page 227](#)

18 - Throttle valve control unit - J338- , throttle valve drive for electronic power control - G186-

- ☐ Angle sensor 1 for throttle valve drive for electronic power control - G187- and angle sensor 2 for throttle valve drive for electronic power control - G188-
- ☐ after replacement, erase adapted values and adapt engine control unit to the throttle valve control unit ⇒ Vehicle diagnostic tester

19 - Coolant temperature sender at radiator outlet - G83-

- ☐ ⇒ [page 226](#)

20 - Intake air temperature transmitter - G42-

- ☐ ⇒ [page 227](#)

21 - Fuel pressure sender - G247-

- ☐ Tightening torque: 22 Nm
- ☐ ⇒ [page 225](#)

22 - Hall sender - G40- (camshaft position sensor)

- ☐ Plug connection ⇒ [page 225](#)

A - Air mass meter - G70-

- ☐ in air filter top part ⇒ [page 226](#)

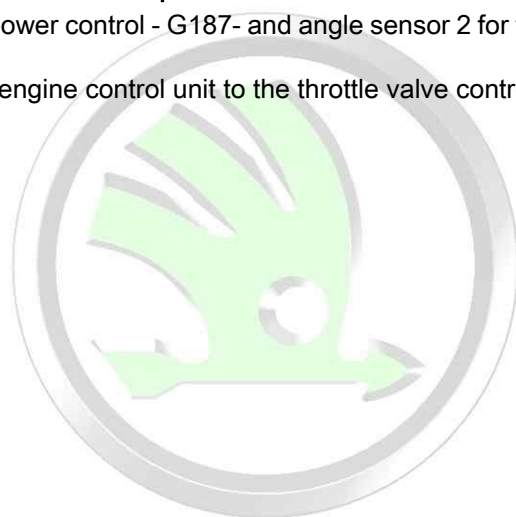
B - 3-pin plug for knock sensor 1 - G61-

- ☐ ⇒ [page 226](#)

C - 3-pin plug for knock sensor 2 - G66-

- ☐ ⇒ [page 226](#)

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**D - Knock sensor 1 - G61-**

- ☐ for cylinders 1 and 2
- ☐ Tightening torque: 20 Nm

The tightening torque influences the knock sensor function

- ☐ ➔ [page 227](#)

**E - Knock sensor 2 - G66-**

- ☐ for cylinders 3 and 4
- ☐ Tightening torque: 20 Nm

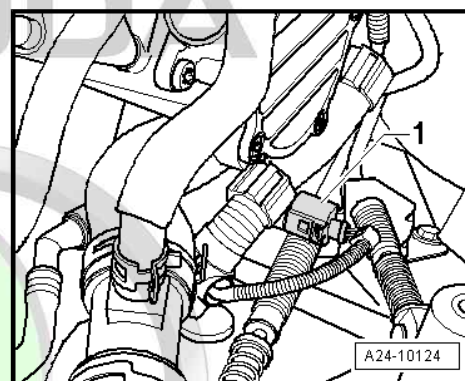
The tightening torque influences the knock sensor function

- ☐ ➔ [page 227](#)

**F - Oil pressure switch - F1 -**

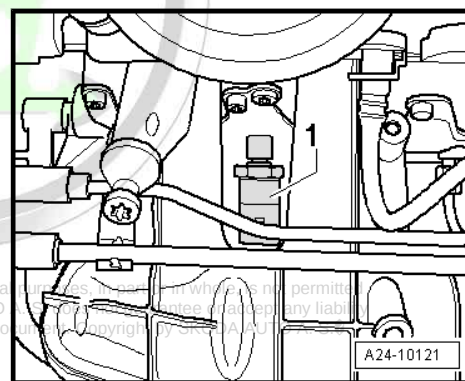
- ☐ ➔ [page 226](#)

**Coolant temperature sender - G62- -1-**

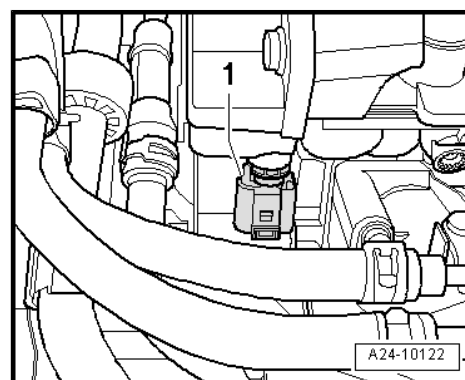


**Fuel pressure sender - G247- -1-**

Tightening torque: 22 Nm



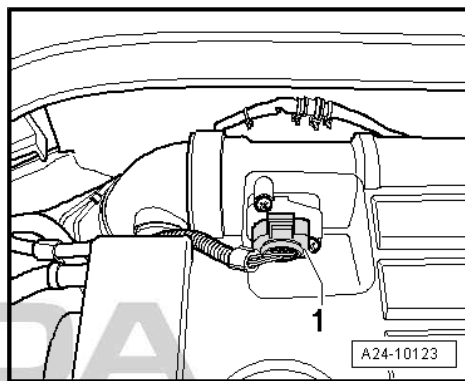
**Hall sender - G40- -1-**



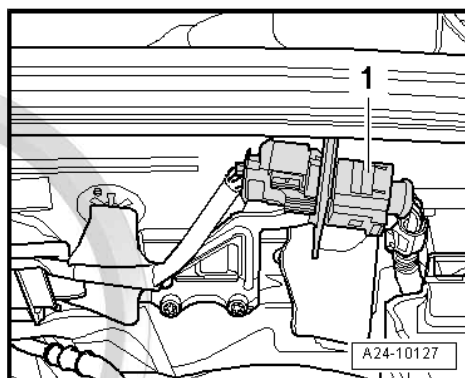
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## Air flow mass meter - G70- -1-

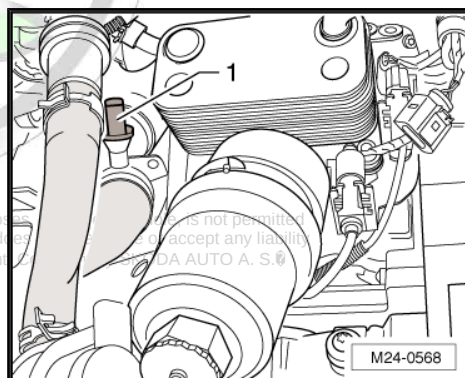


## Plug connection -1- of the lambda probe - G39- and lambda probe heater - Z19-



## Coolant temperature sender at radiator outlet - G83-

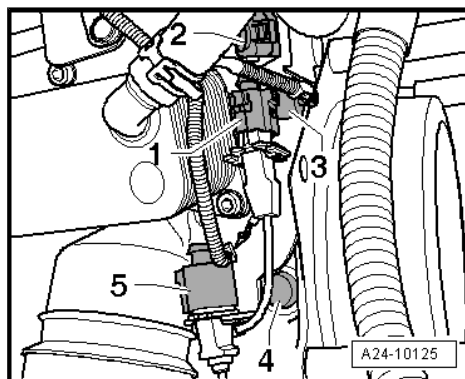
1 - Coolant temperature sender at radiator outlet - G83- , in front of the coolant regulator housing



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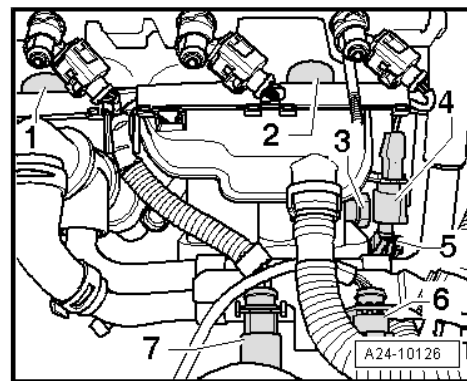
## Connector

- 1 - 3-pin plug (green) for knock sensor 1 - G61-
- 2 - 3-pin plug (brown) for knock sensor 2 - G66-
- 3 - Oil pressure switch - F1-
- 4 - Engine speed sender - G28-
- 5 - 3-pin plug (grey) for engine speed sender - G28-



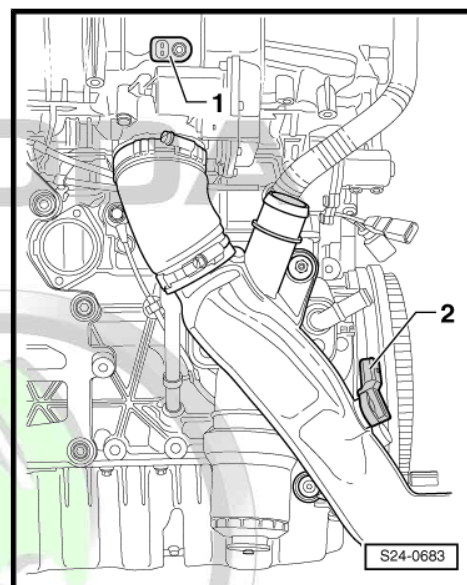
### Installed beneath the intake manifold

- 1 - Knock sensor 1 - G61-
- 2 - Knock sensor 2 - G66-
- 3 - Oil pressure switch - F1-
- 4 - 3-pin plug (brown) for knock sensor 2 - G66-
- 5 - 3-pin plug (grey) for engine speed sender - G28-
- 6 - Plug for Hall sender - G40- and fuel pressure sender - G247-
- 7 - 8-pin plug connection for injection valves



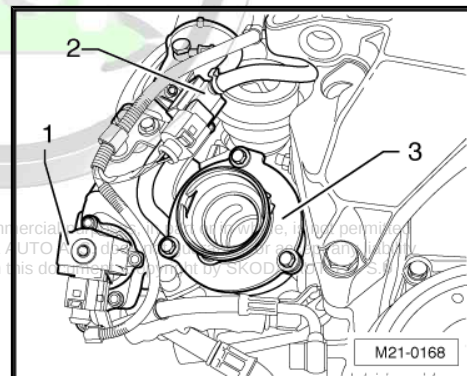
### Sender

- 1 - Intake air temperature transmitter - G42-
- 2 - Charge pressure sender - G31-

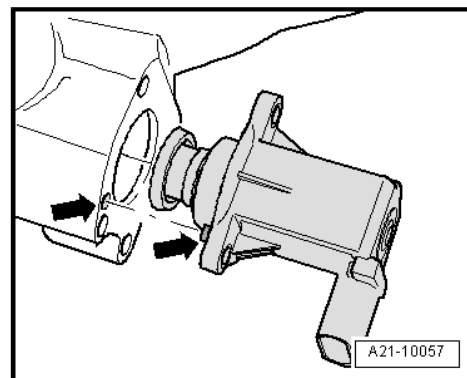


### Parts on the exhaust gas turbocharger

- 1 - Turbocharger divert air valve - N249- , tighten to 7 Nm. Note installation position ➔ [page 227](#) .
- 2 - Solenoid valve for charge pressure control - N75- , tighten to 3 Nm.
- 3 - Exhaust gas turbocharger



**Note the installation position of the turbocharger divert air valve - N249- -arrows-**





### 3 Injection system - summary of components, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### 3.1 Assembly overview - intake manifold

1 - Vacuum hose

2 - Vacuum reservoir

3 - 5 Nm

- ☐ Only for engine identification characters BLR, BLX, BVX, BVY

4 - Top connection pipe

- ☐ for exhaust gas recirculation
- ☐ Only for engine identification characters BLR, BLX, BVX, BVY

5 - Vacuum hose

- ☐ with non-return valve

6 - Crankcase ventilation hose

7 - Sealing ring

- ☐ replace if damaged
- ☐ Only for engine identification characters BLR, BLX, BVX, BVY

8 - Cable strap

9 - 8 Nm

10 - Throttle valve module - J338-

- ☐ with throttle valve drive for electronic power control - G186- , angle sensor 1 for throttle valve drive for electronic power control - G187- and angle sensor 2 for throttle valve drive for electronic power control - G188-

- ☐ When replacing, adapt the engine control unit ⇒ Vehicle diagnostic tester
- ☐ Cleaning the throttle valve control unit ⇒ [page 258](#)

11 - Connection for suction spray pump

12 - Sealing ring

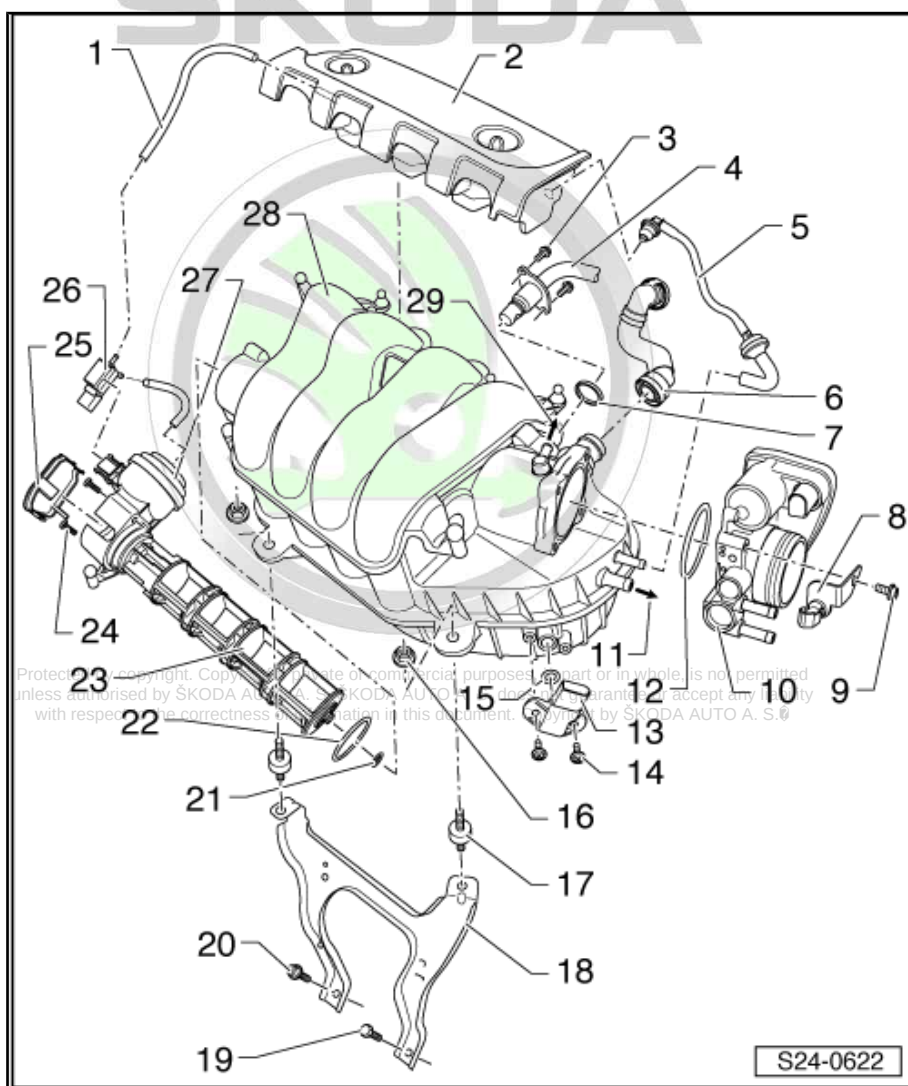
- ☐ replace if damaged

13 - Intake manifold pressure sender - G71- with intake air temperature sender - G42- .

14 - 3 Nm

15 - O-ring

- ☐ replace



- 16 - 10 Nm
- 17 - Rubber-metal bearing, 3 Nm
- 18 - Intake manifold support
- 19 - 25 Nm
- 20 - 40 Nm
- 21 - Sealing ring
  - ☐ replace if damaged
- 22 - Sealing ring
  - ☐ replace if damaged
- 23 - Reversing switch drum
- 24 - 7 Nm
- 25 - Cover
- 26 - Valve for variable intake manifold changeover - N156-
- 27 - Vacuum setting element
  - ☐ check ➔ [page 264](#)
- 28 - Intake manifold
  - ☐ removing and installing ➔ [page 243](#)
- 29 - Connection for activated charcoal filter solenoid valve 1 - N80-



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## 3.2 Suction spray pump - summary of components

1 - to connect brake servo

2 - Pressure sensor for the  
brake servo unit - G294-

3 - Sealing ring

❑ replace if damaged

4 - Connecting hose

❑ Vehicles with automatic  
gearbox have an addi-  
tional connection for the  
brake vacuum pump -  
V192-

5 - Hose

❑ To intake hose

6 - Spring strap clamp

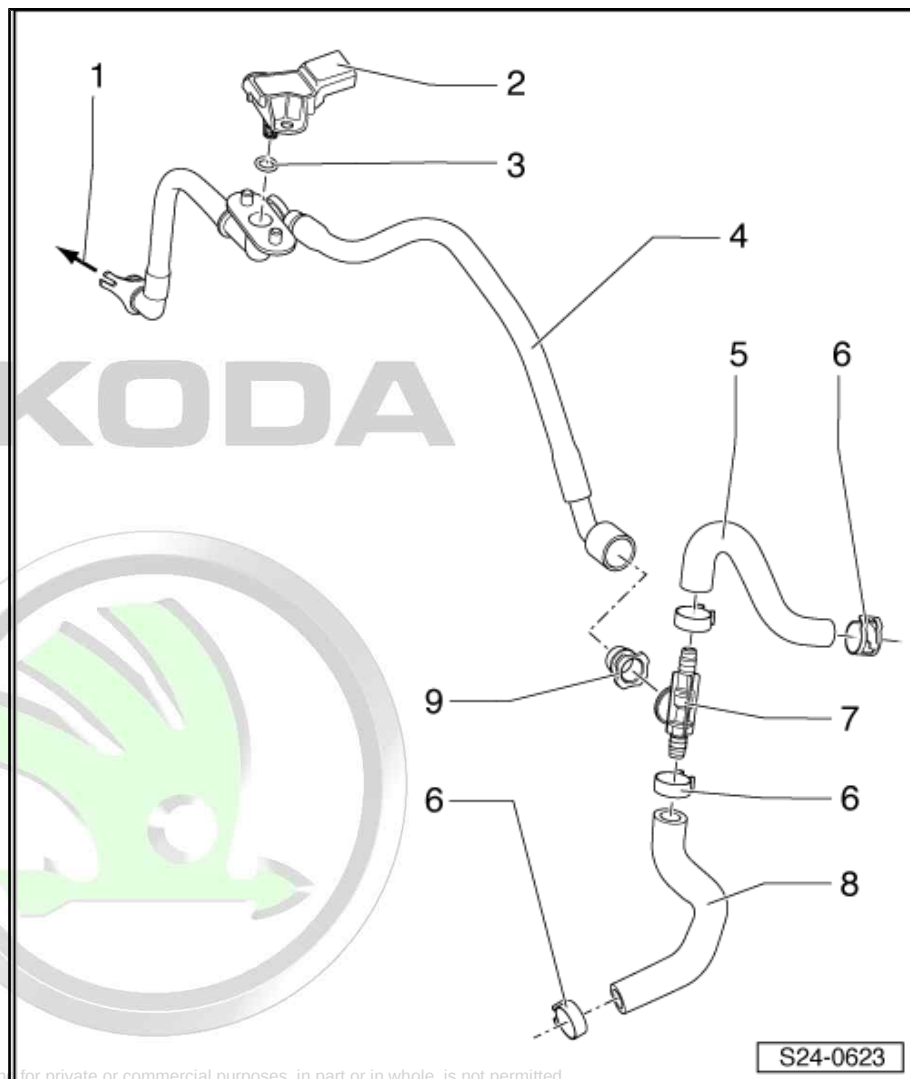
7 - Suction spray pump

8 - Hose

❑ To intake manifold

9 - Gasket

❑ replace if damaged



S24-0623

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### 3.3 Fuel distributor with intake manifold flap motor - V157- - summary of components, engine identification characters BLR, BLX, BLY

1 - Fuel pressure sender for low pressure - G410 - , 15 Nm

2 - Low-pressure pipe



#### Note

- ◆ counterhold when loosening the pressure limiting valve
- ◆ Before fitting, check the pressure limiting valve is at a torque of 30 Nm

- ☐ do not install under tension
- ☐ Tighten union nut to 22 Nm

3 - 10 Nm

4 - Gasket

- ☐ replace

5 - Fuel distributor

- ☐ with intake manifold flap motor - V157- with intake manifold flap potentiometer - G336-
- ☐ When replacing, adapt the engine control unit  
⇒ Vehicle diagnostic tester
- ☐ removing and installing  
⇒ [page 244](#)

6 - CLIC hose clamp

- ☐ secure with CLIC hose clamp pliers . e.g. - V.A.G 1723-

7 - Connecting piece

8 - High pressure tube

- ☐ do not install under tension

9 - Hollow screw, 15 Nm

- ☐ with conical seat
- ☐ replace
- ☐ pay attention to cleanliness

10 - 10 Nm

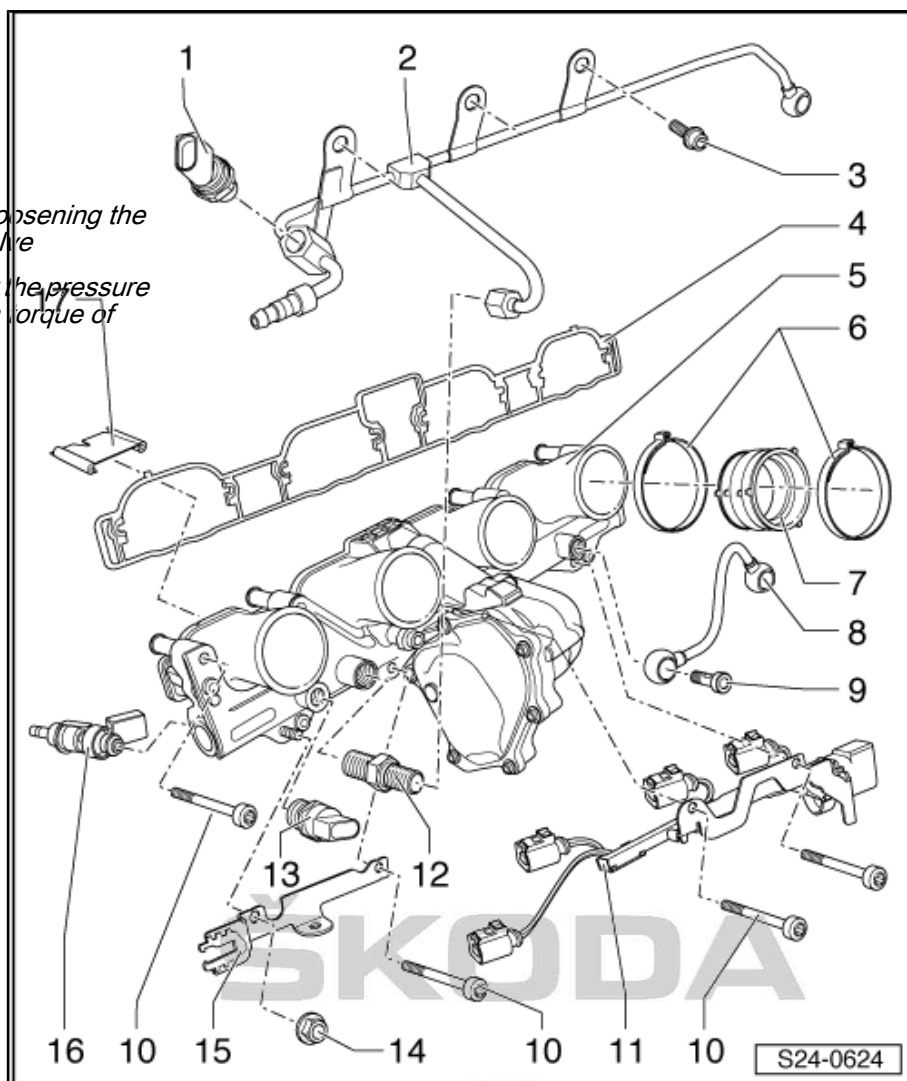
11 - Cable rail

- ☐ with connectors for injection valves

12 - Pressure limiting valve, 30 Nm

13 - Fuel pressure sender - G247- , 22 Nm

- ☐ Moisten thread and cone with clean engine oil
- ☐ removing and installing ⇒ [page 246](#)
- ☐ check ⇒ [page 265](#)





14 - 10 Nm

15 - Cable strap

16 - Injection valve for cylinder 1 - N30- to injection valve for cylinder 4 - N33-

- ☐ removing and installing ⇒ [page 253](#)

17 - Divider plate

### 3.4 Fuel distributor with intake manifold flap motor - V157- - summary of components, engine identification characters BVX, BVY, BVZ

1 - Low-pressure pipe



#### Note

- ◆ counterhold when loosening the pressure limiting valve
- ◆ Before fitting, check the pressure limiting valve is at a torque of 30 Nm

- ☐ do not install under tension
- ☐ Tighten union nut to 22 Nm

2 - 10 Nm

3 - Gasket

- ☐ replace

4 - Fuel distributor

- ☐ with intake manifold flap motor - V157- with intake manifold flap potentiometer - G336-
- ☐ When replacing, adapt the engine control unit ⇒ Vehicle diagnostic tester
- ☐ removing and installing ⇒ [page 244](#)

5 - CLIC hose clamp

- ☐ secure with CLIC hose clamp pliers . e.g. - V.A.G 1723-

6 - Connecting piece

- ☐ do not install under tension

8 - Hollow bolt with conical seat, 15 Nm

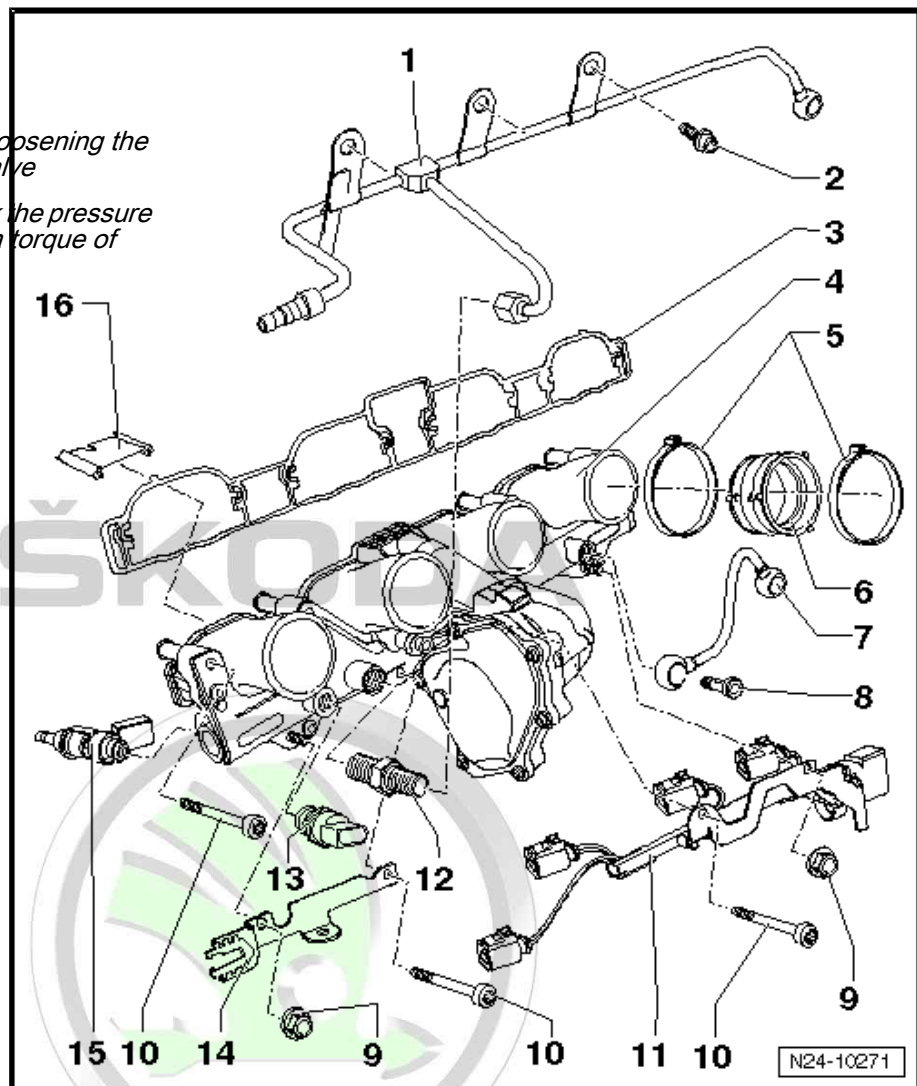
- ☐ replace
- ☐ pay attention to cleanliness

9 - 10 Nm

10 - 10 Nm

11 - Cable rail

- ☐ with connectors for injection valves



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12 - Pressure limiting valve, 30 Nm

13 - Fuel pressure sender - G247- , 22 Nm

- ☐ Moisten thread and cone with clean engine oil
- ☐ removing and installing ⇒ [page 246](#)
- ☐ check ⇒ [page 265](#)

14 - Cable strap

15 - Injection valve for cylinder 1 - N30- to injection valve for cylinder 4 - N33-

- ☐ removing and installing ⇒ [page 253](#)

16 - Divider plate

### 3.5 High pressure pump - summary of components, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

1 - Tappet

2 - Sealing ring

- ☐ replace
- ☐ before fitting moisten lightly with clean engine oil

3 - High pressure pump

- ☐ with fuel pressure regulating valve - N276-



**Caution**

*Do not loosen threaded connector for low pressure and high pressure connections - risk of damaging the high pressure pump!*

- ☐ removing and installing ⇒ [page 259](#)

4 - Dust cap for vent valve

5 - 10 Nm

6 - Hollow screw, 15 Nm

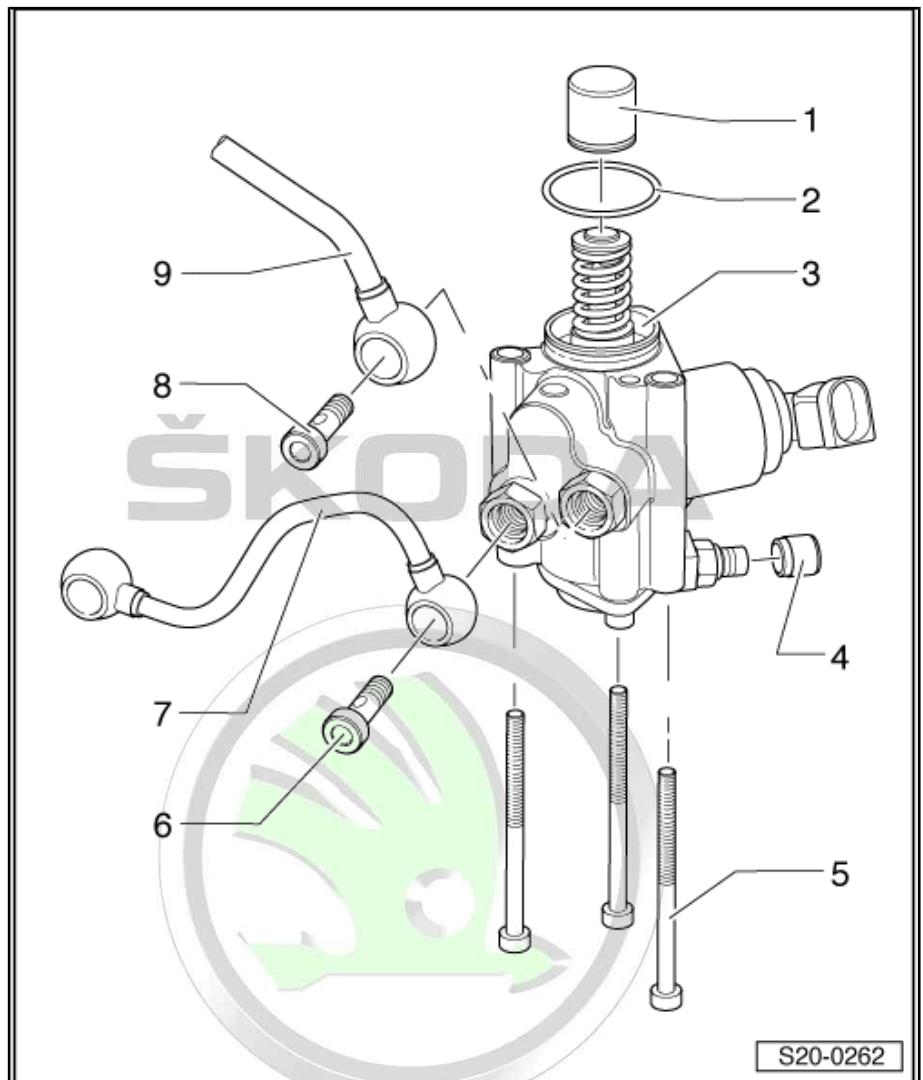
- ☐ with conical seat
- ☐ Counterhold the threaded connector on the high pressure pump when loosening
- ☐ replace
- ☐ pay attention to cleanliness

7 - High pressure tube

- ☐ Follow safety precautions for pressure reduction in the high pressure system ⇒ [page 5](#)
- ☐ before installation, check that the threaded connector on the high pressure pump has a tightening torque of 40 Nm

8 - Hollow screw, 15 Nm

- ☐ with conical seat





- ☐ Counterhold the threaded connector on the high pressure pump when loosening
- ☐ replace
- ☐ pay attention to cleanliness

### 9 - Low-pressure pipe

- ☐ before installation, check that the threaded connector on the high pressure pump has a tightening torque of 30 Nm

## 3.6 Summary of components - air filter

Positions 21 to 28 are only present on vehicles with "cold country equipment".

1 - Air filter cover

2 - 2 Nm

3 - 8 Nm

4 - 2 Nm

5 - Support

6 - to connection for suction spray pump

7 - Spring strap clamp

8 - Air intake hose

9 - O-ring

- ☐ replace

10 - Intake air temperature sender 2 - G299-

11 - Filter element

12 - Air filter housing

13 - Container with pre-cubic contents

14 - 20 Nm

15 - Intake air duct

16 - Nut

17 - Air guide duct

- ☐ to the lock carrier

18 - 2 Nm

19 - Air catcher

20 - Flap

21 - Intake manifold

22 - Grommet

23 - Bushing

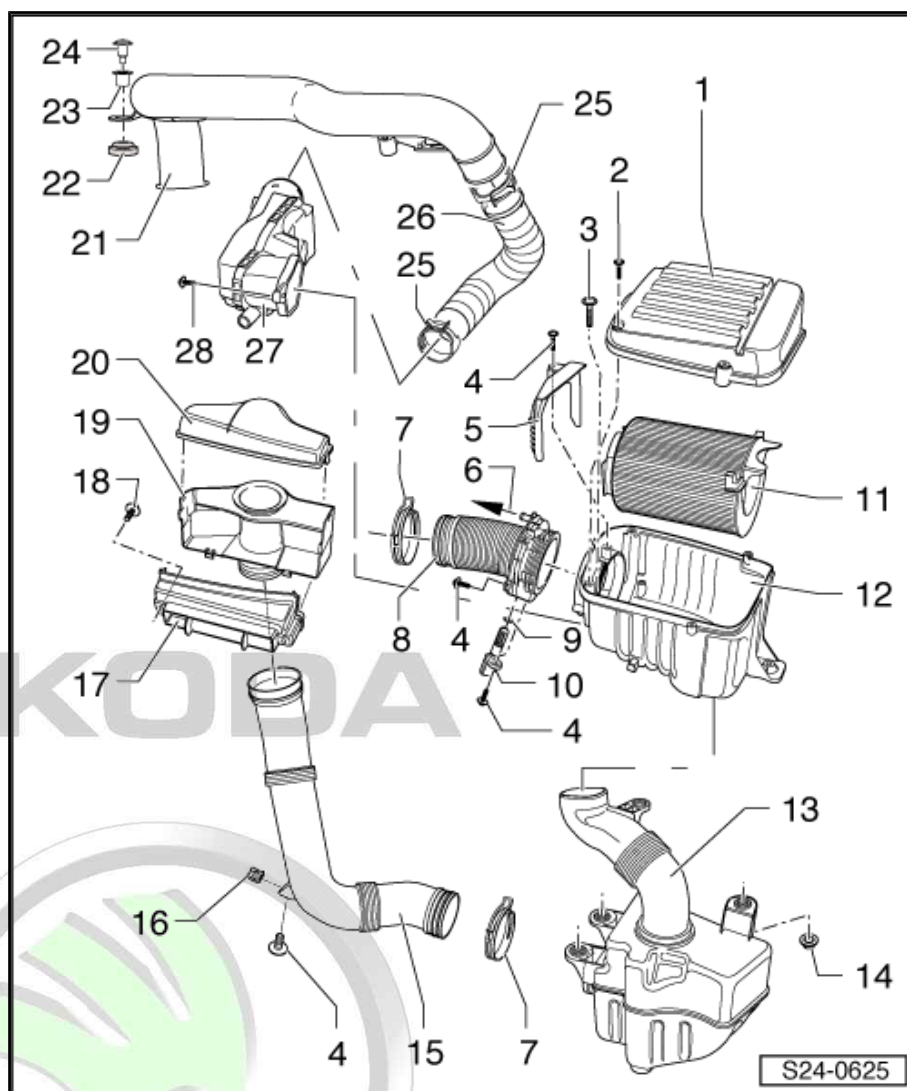
24 - 8 Nm

25 - Spring strap clamp

26 - Air hose

27 - Regulator box

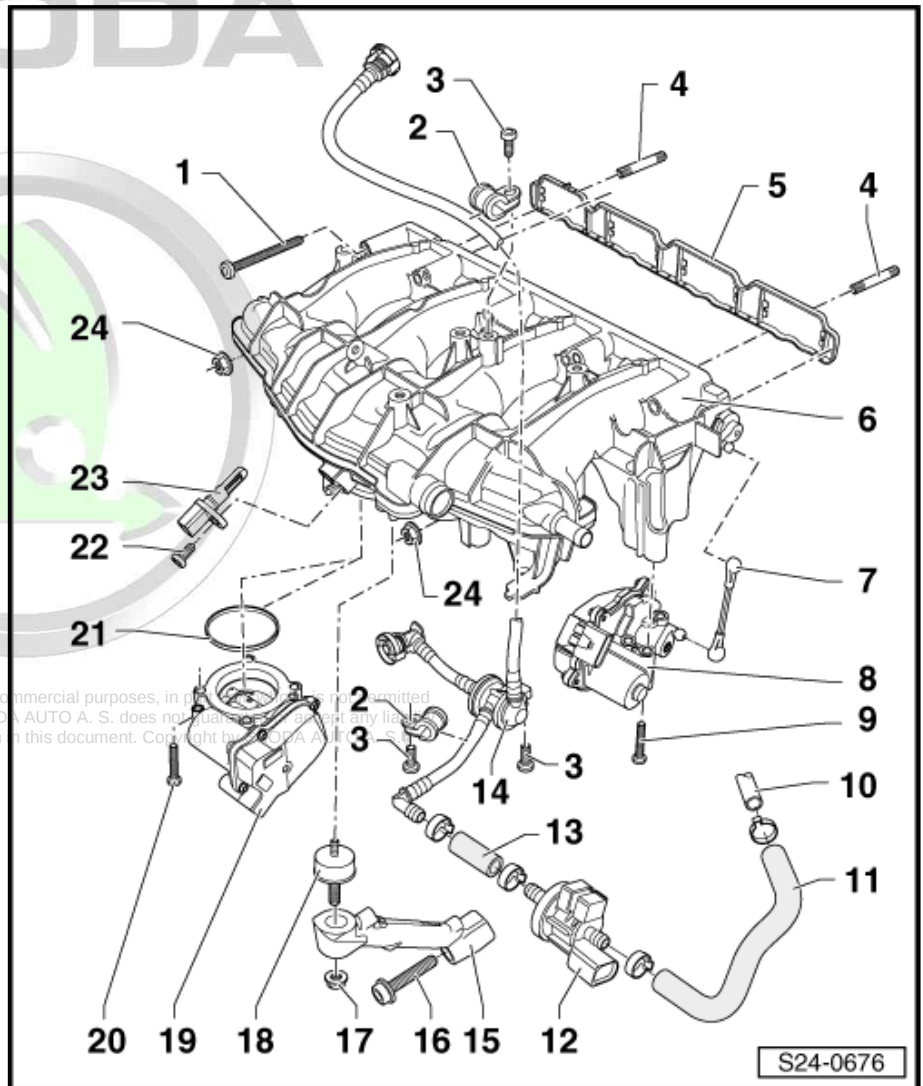
28 - 2 Nm



## 4 Injection system - summaries of components, engine identification characters BWA

### 4.1 Assembly overview - intake manifold

- 1 - 10 Nm  
2 - Clamping device  
3 - 3 Nm  
4 - Pin screw, 10 Nm  
5 - Gasket  
☐ replace  
6 - Intake manifold  
☐ with intake manifold flaps  
☐ removing and installing  
⇒ [page 247](#)  
7 - Coupling rod  
8 - Intake manifold flap motor - V157-  
☐ with intake manifold flap potentiometer - G336-  
☐ removing and installing  
⇒ [page 250](#)  
9 - 7 Nm  
10 - to the activated charcoal filter system  
11 - Hose  
12 - Activated charcoal filter solenoid valve 1 - N80-  
13 - Hose  
14 - Double non-return valve  
☐ check ⇒ [page 265](#)  
15 - Intake manifold support  
16 - 25 Nm  
17 - 10 Nm  
18 - Rubber-metal bearing, 8 Nm  
19 - Throttle valve module - J338-  
☐ with throttle valve drive for electronic power control - G186- , angle sensor 1 for throttle valve drive for electronic power control - G187- and angle sensor 2 for throttle valve drive for electronic power control - G188-  
☐ after replacement, erase adapted values and adapt engine control unit to the throttle valve control unit  
⇒ Vehicle diagnostic tester  
☐ removing and installing ⇒ [page 257](#)





20 - 7 Nm

21 - Sealing ring

- ☐ replace if damaged

22 - 5 Nm

23 - Intake air temperature transmitter - G42-

24 - 10 Nm

## 4.2 Fuel distributor - summary of components

Vehicles up to 03.2006

1 - Injection valve for cylinder 1  
- N30- to injection valve for cylinder 4 - N33-

- ☐ removing and installing  
⇒ [page 253](#)

2 - 5 Nm

3 - Fuel distributor

- ☐ the fuel distributor is removed with the intake manifold
- ☐ removing and installing  
⇒ [page 251](#)

4 - Plate nut

5 - Pressure limiting valve,  
30 Nm

6 - Low-pressure pipe



### Note

- ◆ when removing, counterhold pressure limiting valve
- ◆ Before fitting, check the pressure limiting valve is at a torque of 30 Nm

- ☐ do not install under tension
- ☐ Tighten union nut to 22 Nm

7 - Support

8 - High pressure tube

- ☐ do not install under tension
- ☐ Tighten union nut on fuel distributor to 33 Nm
- ☐ Tighten union nut on high-pressure pump 27 Nm

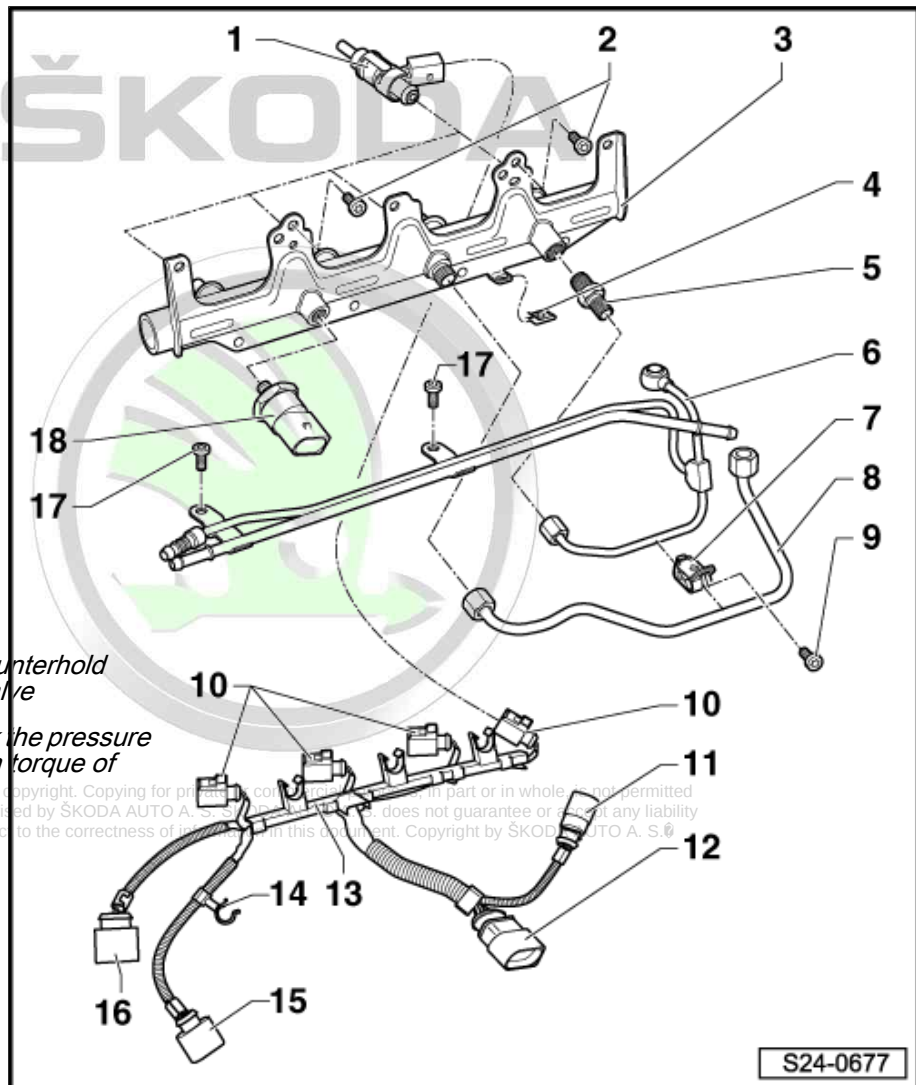
9 - 3 Nm

10 - Connector

- ☐ for injection valves

11 - Connector

- ☐ for fuel pressure sender - G247- and Hall sender - G40-



## 12 - Connector

- ☐ for injection valves

## 13 - Cable rail

## 14 - Retaining clip

- ☐ hook in at bottom right of sleeve of intake manifold

## 15 - Connector

- ☐ For Hall sender - G40-

## 16 - Connector

- ☐ Fuel pressure sender - G247-

## 17 - 5 Nm

## 18 - Fuel pressure sender - G247- , 22 Nm

- ☐ Moisten thread and cone with clean engine oil
- ☐ removing and installing ➔ [page 252](#)
- ☐ check ➔ [page 265](#)

## Vehicles as of 04.2006

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## 1 - Injection valve for cylinder 1 - N30- to injection valve for cylinder 4 - N33-

- ☐ removing and installing  
➔ [page 253](#)

## 2 - 5 Nm

## 3 - Fuel distributor

- ☐ the fuel distributor is removed with the intake manifold
- ☐ removing and installing  
➔ [page 251](#)

## 4 - Low pressure fuel hose

- ☐ to high pressure pump

## 5 - Pressure limiting valve, 30 Nm

## 6 - Plate nut

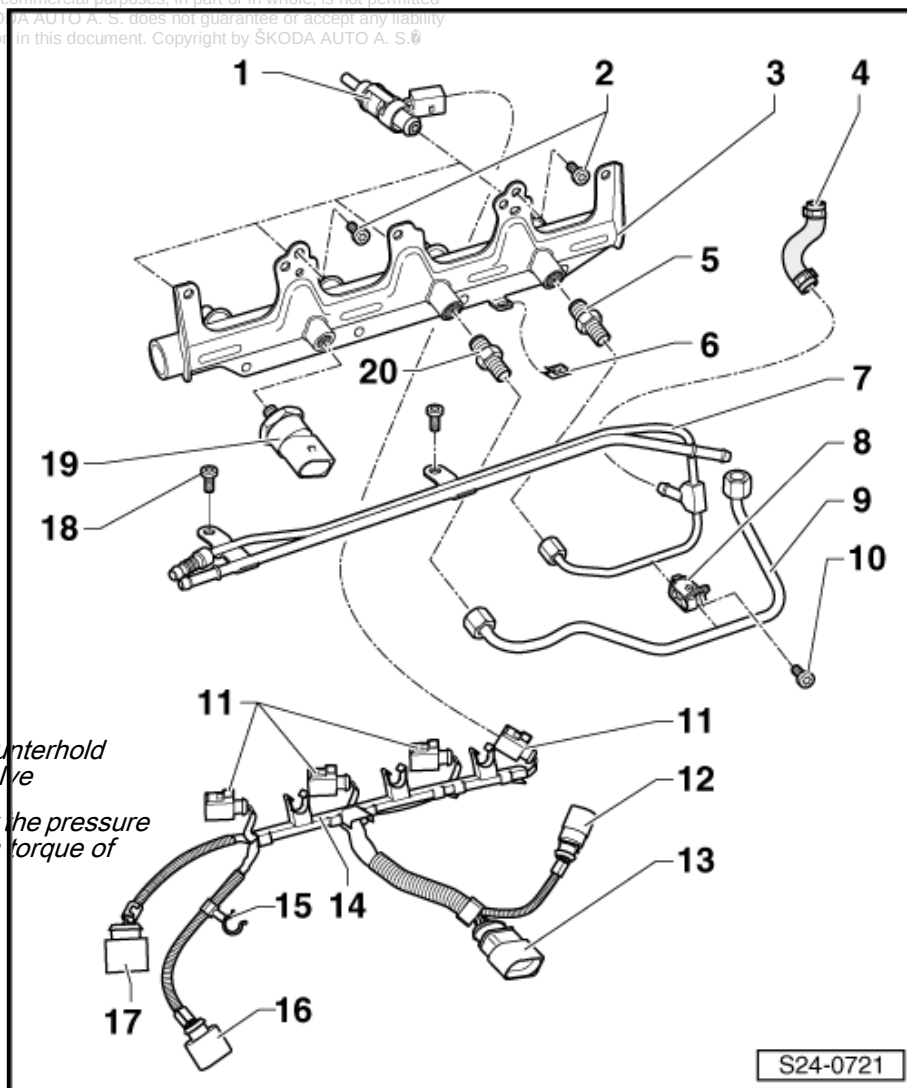
## 7 - Low-pressure pipe



### Note

- ◆ when removing, counterhold pressure limiting valve
- ◆ Before fitting, check the pressure limiting valve is at a torque of 30 Nm

- ☐ do not install under tension
- ☐ Tighten union nut to 22 Nm







## 8 - Support

## 9 - High pressure tube



### Note

- ◆ *when removing, counterhold screw connector on fuel distributor and on high pressure pump*
- ◆ *before installation, check that the screw connector on the fuel distributor has a tightening torque of 30 Nm*
- ◆ *before installation, check that the screw connector on the high pressure pump has a tightening torque of 40 Nm*

- ☐ do not install under tension
- ☐ Tighten union nuts on fuel distributor and on the high pressure pump to 27 Nm

## 10 - 3 Nm

## 11 - Connector

- ☐ for injection valves

## 12 - Connector

- ☐ for fuel pressure sender - G247- and Hall sender - G40-

## 13 - Connector

- ☐ for injection valves

## 14 - Cable rail

## 15 - Retaining clip

- ☐ hook in at bottom right of sleeve of intake manifold

## 16 - Connector

- ☐ For Hall sender - G40-

## 17 - Connector

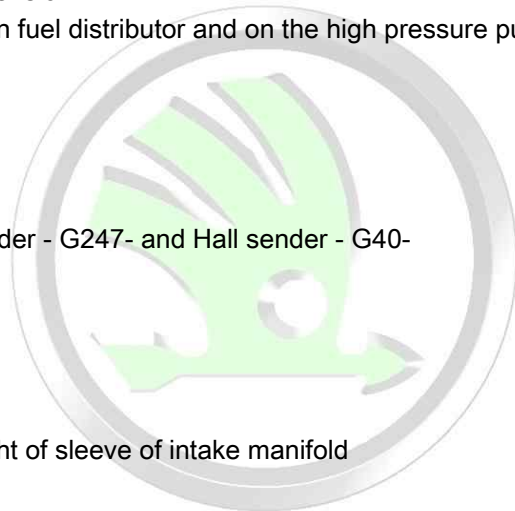
- ☐ Fuel pressure sender - G247-

## 18 - 5 Nm

## 19 - Fuel pressure sender - G247- , 22 Nm

- ☐ Moisten thread and cone with clean engine oil
- ☐ removing and installing ⇒ [page 252](#)
- ☐ check ⇒ [page 265](#)

## 20 - Screw connector, 30 Nm



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## 4.3 High-pressure pump - summary of components, engine identification characters BWA



### Note

From 04.2006, the low-pressure line on the high-pressure pump was switched from pipe with hollow bolt to hose connection with spring-type clip.

#### 1 - Tappet

#### 2 - O-ring

- ☐ replace
- ☐ before fitting moisten lightly with clean engine oil

#### 3 - High pressure pump

- ☐ with fuel pressure regulating valve - N276-
- ☐ removing and installing  
⇒ [page 262](#)

#### 4 - 10 Nm

#### 5 - Union nut, 27 Nm



### Note

- ◆ when loosening, counterhold screw connector
- ◆ before fitting the high pressure tube, check that the screw connector has a tightening torque of 40 Nm

- ☐ do not install high pressure tube under tension

#### 6 - High pressure tube

- ☐ Follow safety precautions for pressure reduction in the high pressure system  
⇒ [page 5](#)

#### 7 - Screw connector, 30 Nm

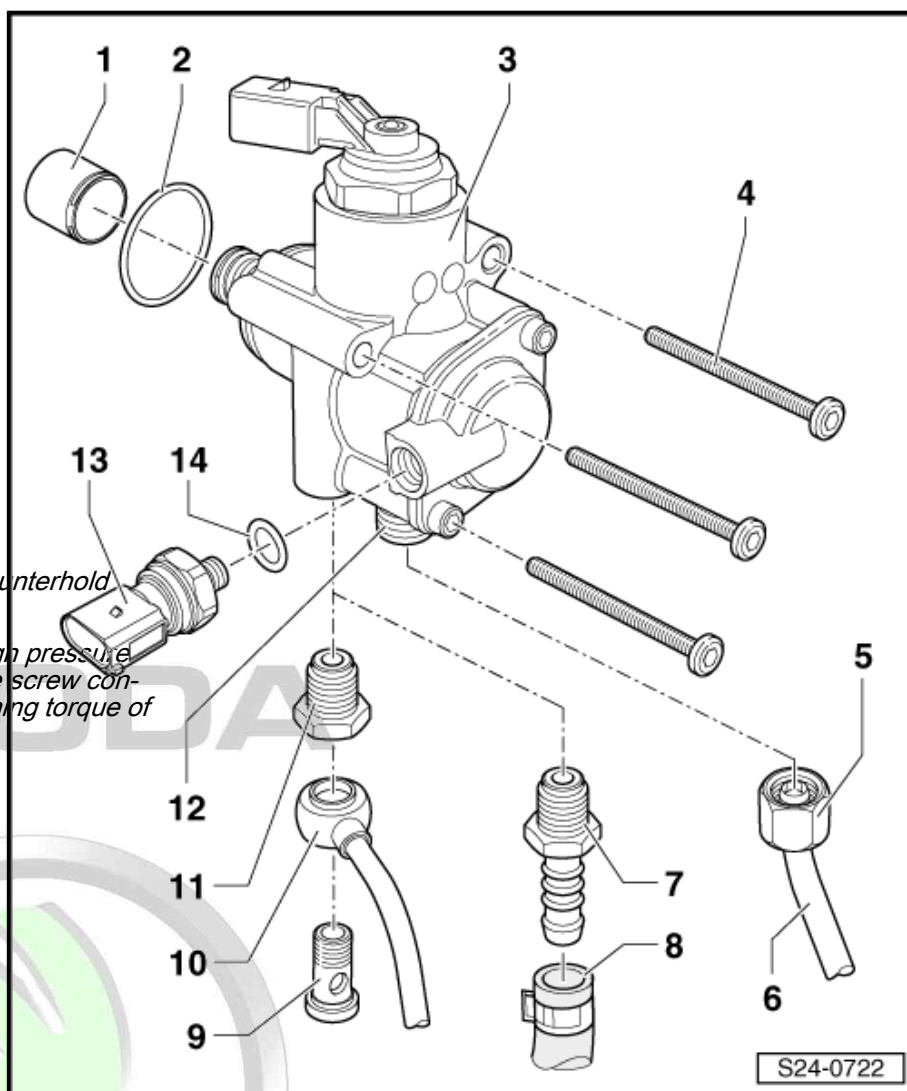
- ☐ Vehicles as of 04.2006
- ☐ only replace if is has been loosened
- ☐ When replacing the screw connector, you must leave the old sealing ring in the high-pressure pump. It is compressed by the supplier before first assembly and cannot be removed. The new screw connector has a "deformable sealing lip" to form the seal.

#### 8 - Low pressure fuel hose

- ☐ Vehicles as of 04.2006
- ☐ secure with spring strap clip

#### 9 - Hollow screw, 15 Nm

- ☐ with conical seat
- ☐ Vehicles up to 03.2006
- ☐ Counterhold the threaded connector on the high pressure pump for loosening
- ☐ replace





- ☐ pay attention to cleanliness

#### 10 - Low-pressure pipe

- ☐ Vehicles up to 03.2006
- ☐ before installation, check that the threaded connector on the high pressure pump has a tightening torque of 30 Nm

#### 11 - Threaded connector, 30 Nm

- ☐ Vehicles up to 03.2006
- ☐ only replace if it has been loosened
- ☐ When replacing the threaded connector, you must leave the old sealing ring in the high-pressure pump. It is compressed by the supplier before first assembly and cannot be removed. The new screw connector has a "deformable sealing lip" to form the seal.

#### 12 - Screw connector, 40 Nm

- ☐ for high pressure tube



#### Caution

*Do not loosen screw connector for high pressure tube - risk of damaging the high pressure pump!*

# ŠKODA

#### 13 - Fuel pressure sender for low pressure - G410- , 15 Nm

#### 14 - Sealing ring

- ☐ replace



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## 4.4 Summary of components - air filter

1 - Air mass meter - G70-

2 - 3 Nm

3 - Air filter top part/engine cover

- ☐ Follow the assembly sequence when removing  
⇒ [page 242](#)
- ☐ disassembling  
⇒ [page 242](#)

4 - Spring strap clamp

5 - Intake air duct

6 - Filter element

7 - 1.5 Nm

8 - Air filter lower part

- ☐ Follow the assembly sequence when removing  
⇒ [page 242](#)
- ☐ disassembling  
⇒ [page 242](#)

9 - 3 Nm

10 - Heat shield

11 - Rubber grommet

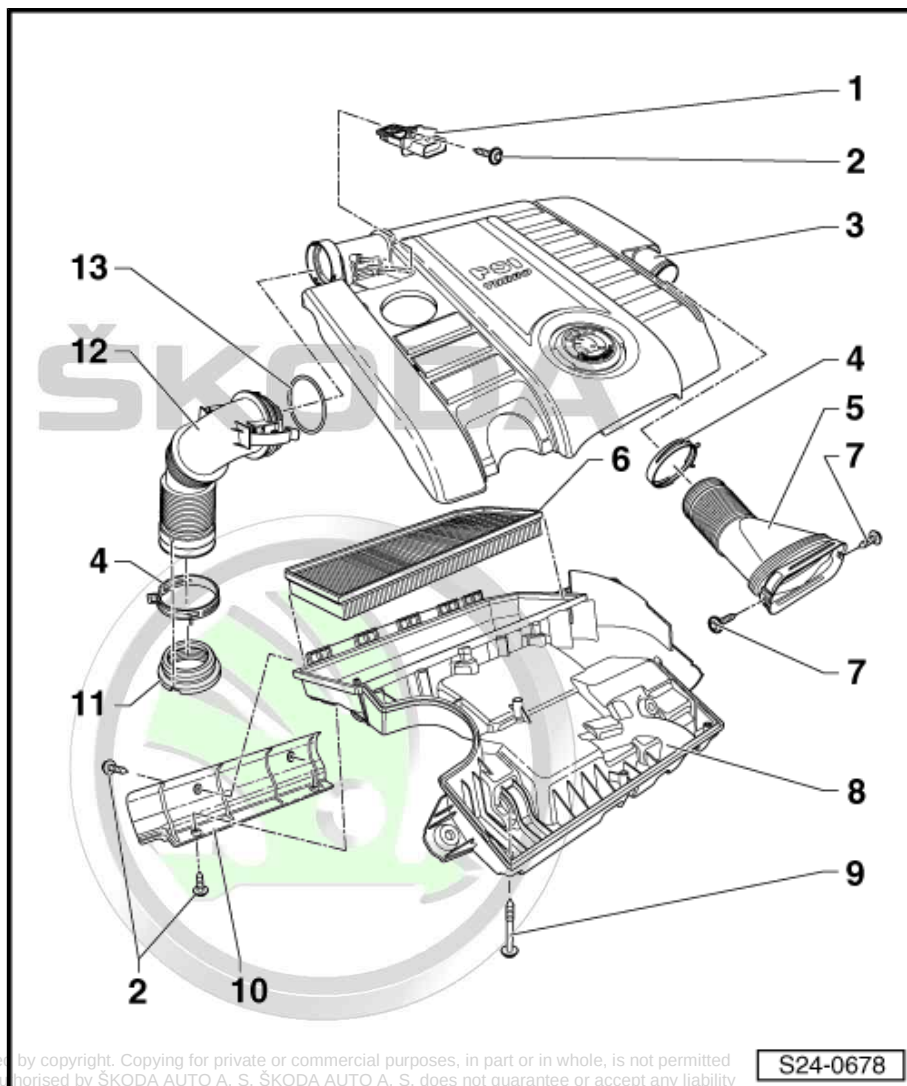
- ☐ Note the assembly marking

12 - Air intake hose

- ☐ Note the assembly marking

13 - O-ring

- ☐ replace if damaged



S24-0678

## 5 Repairing the injection system

### 5.1 Removing and disassembling air filter (engine cover), engine identification characters BWA

#### Removing

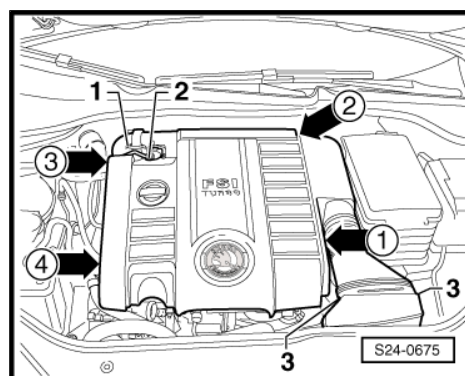
- Detach intake hose -1-.
- Disconnect plug connection -2-.
- Unscrew bolts -3- and detach the hose.



#### Caution

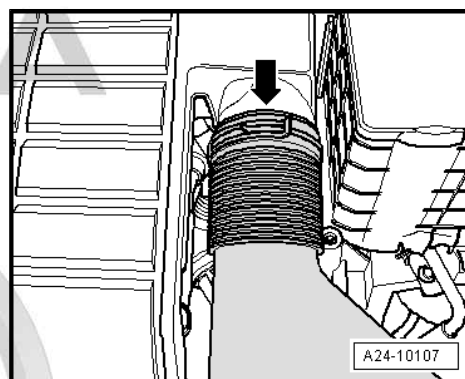
*Follow the same sequence when removing the engine cover.*

- Pull the engine cover upwards with a sudden motion in order from -arrow 1- to -arrow 4-. Remove engine cover.

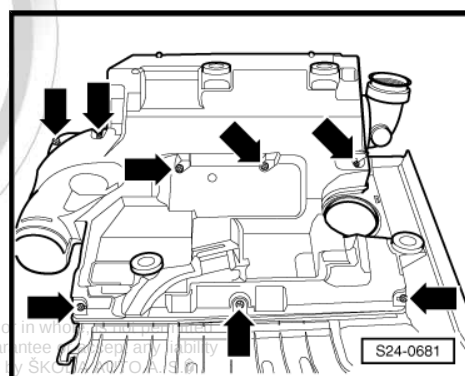


#### Dismantling

- Remove intake air duct -arrow-.



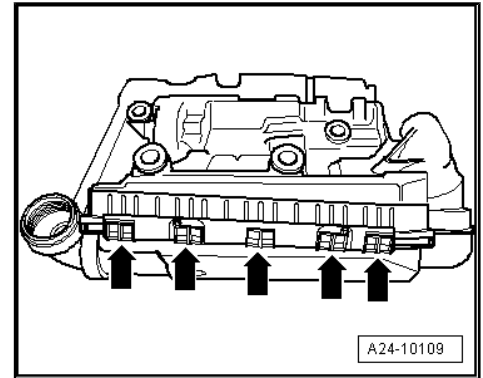
- Remove bolts -arrows-.



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- Disconnect engine cover. Note the catches -arrows-.



## 5.2 Removing and installing intake manifold, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

### Special tools and workshop equipment required

- ◆ Hose clamps up to  $\varnothing$  25 mm - MP7-602 (3094) -
- ◆ CLIC hose clamp pliers , e.g. -V.A.G 1723-
- ◆ Pliers for spring strap clamps



### Note

- ◆ *Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ➔ [page 4](#) .*
- ◆ *Use the summaries of components on the previous pages ➔ [page 228](#) .*

### Removing

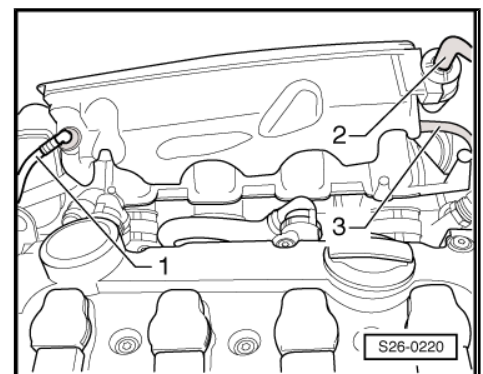
- Switch off ignition and all electrical loads, and pull out ignition key.
- Pull off engine cover upwards at the sides.
- Pull vacuum reservoir off intake manifold.
- Disconnect vacuum lines -1- and -3- from the vacuum reservoir.
- Disconnect plug and vacuum line -2- from the activated charcoal filter solenoid valve 1 - N80- .

### Vehicles with engine identification characters BLR, BLX, BVX, BVY

- Remove connection pipe of exhaust gas recirculation ➔ [page 291](#) .

### Continued for all vehicles

- Pull out oil dipstick.
- Clamp off coolant hoses at the throttle valve housing with the hose clamps - MP7-602- . Open the spring-type clip with the spring-type clip pliers and pull off the hoses.
- Disconnect all plug connections at the intake manifold.



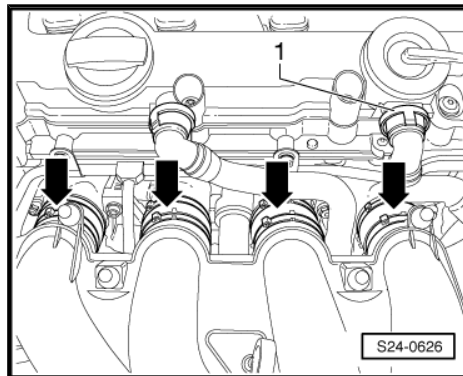


- Detach hose -1- of the crankcase ventilation from the cylinder head cover.
- Open the hose clamps -arrows- between intake manifold and fuel distributor.



#### Note

*Spring-type clip pliers - V.A.G 1723- are recommended for installing hose clamps.*

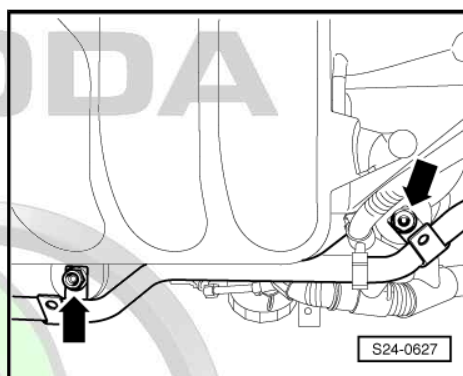


- Remove securing nuts -arrows-.
- Remove intake manifold upwards.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace seal for intake manifold.



### 5.3 Removing and installing fuel distributor with intake manifold flaps, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### Removing

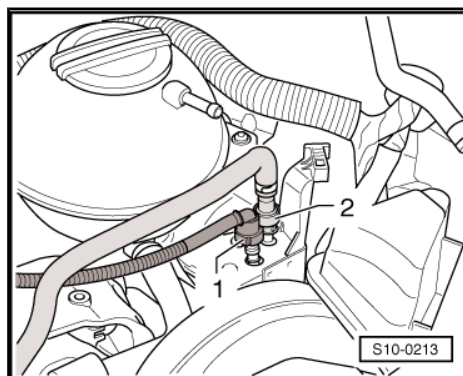


#### WARNING

**Relieve pressure in the high pressure system ➔ page 5.**

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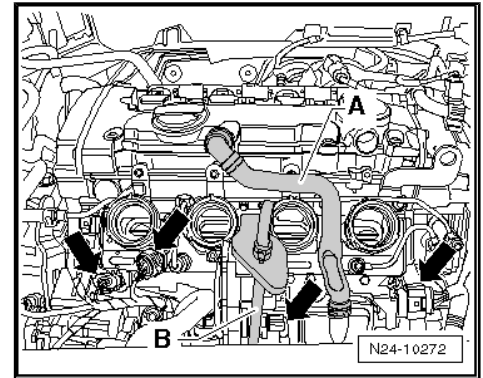
- Removing the intake manifold ➔ page 243 .
- Disconnect fuel feed line -2- (press in the circlip).
- Remove fuel pipes.



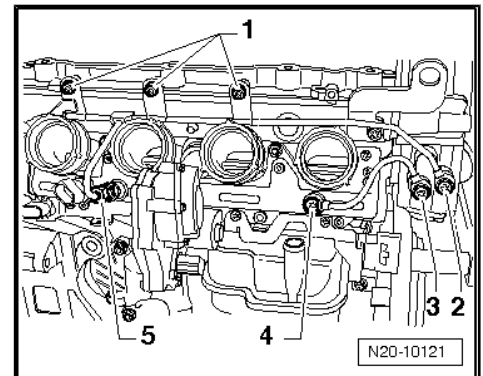
- Disconnect the plug connections on the fuel distributor -arrows-.
- Remove pipe for crankcase ventilation -A-.
- Remove oil dipstick with guide tube -B- from the engine.

**i Note**

*When loosening the fuel pipes, counterhold applicable screw connector.*



- Unscrew bolts -1- to -5- and remove fuel pipes.

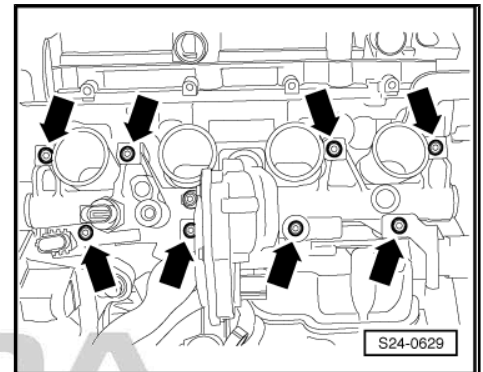


- Unscrew the securing bolts -arrows- of the fuel distributor.
- Carefully disconnect the fuel distributor with intake manifold flaps from the injection valves.

**Install**

Installation is carried out in the reverse sequence. Pay attention to the following:

- ◆ Before installing, all plugs must be connected to the injection valves.
- ◆ If an injection valve has been pulled out of the cylinder head when removing the fuel distributor, the Teflon sealing ring must be replaced ⇒ [page 255](#).
- ◆ Replace O-rings between injection valves and fuel distributor and lightly moisten with clean engine oil.
- ◆ If the fuel distributor has been replaced, the intake manifold flap potentiometer - G336- must be adapted to the engine control unit ⇒ Vehicle diagnostic tester.
- ◆ Fit fuel distributor on the cylinder head and press uniformly onto the injection valves.





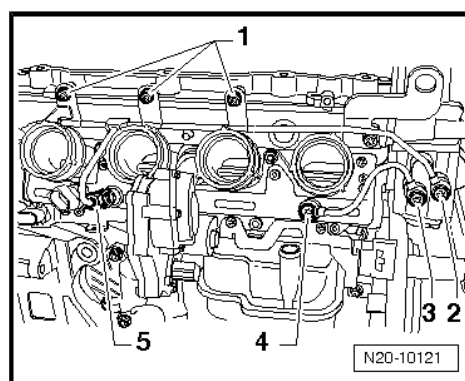
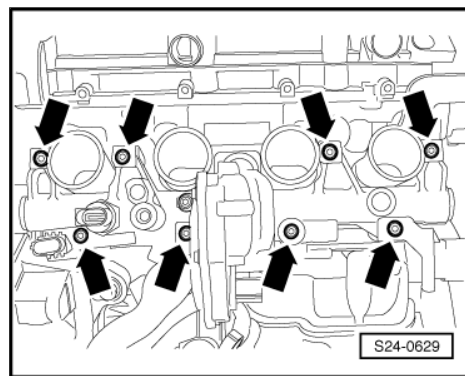
- Tighten securing bolts -arrows- of the fuel distributor to 10 Nm.



#### Note

*Before installing the fuel pipes, check the applicable screw connector has the correct torque.*

- ◆ High-pressure connector in high pressure pump . 40 Nm
- ◆ Low-pressure connector in high pressure pump . 30 Nm
- ◆ Pressure limiting valve in fuel distributor: 30 Nm
- Install fuel pipes with new hollow bolts and start by tightening all bolts hand-tight.
- Tighten securing bolts of the high-pressure pump to 10 Nm.
- Then tighten the bolts/union nuts -1- to -5- in the following order:
  - 1 - Securing bolts -1- to 10 Nm
  - 2 - Hollow bolt -2- to 15 Nm
  - 3 - Hollow bolt -3- to 15 Nm
  - 4 - Hollow bolt -4- to 15 Nm
  - 5 - Union nut -5- to 22 Nm



## 5.4 Removing and installing fuel pressure sender - G247- , engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

### Special tools and workshop equipment required

- ◆ Open ring spanner with 3/8" drive, wrench size 27mm , commercially available
- ◆ Assembly device - T10118-

### Removing



#### Note

- ◆ *Safety precautions when working on the fuel supply system ⇒ [page 4](#) .*
- ◆ *Observe cleanliness requirements when working on the fuel system ⇒ [page 6](#) .*



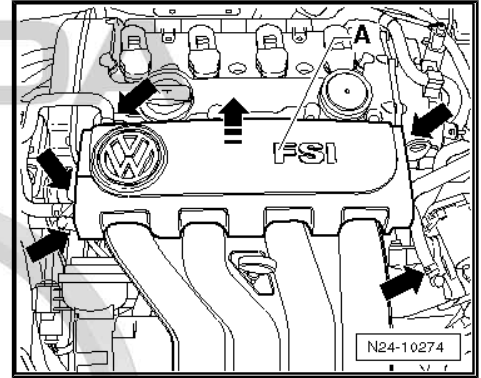
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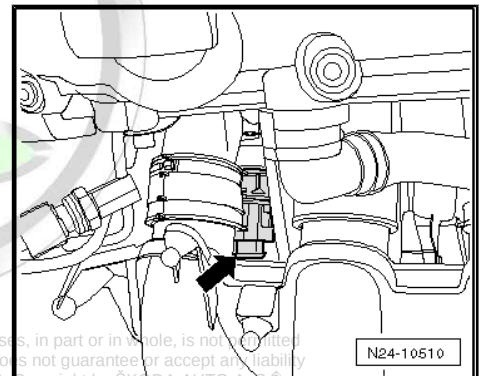
**Relieve pressure in the high pressure system ⇒ [page 5](#) .**

- Pull off engine cover upwards at the sides.

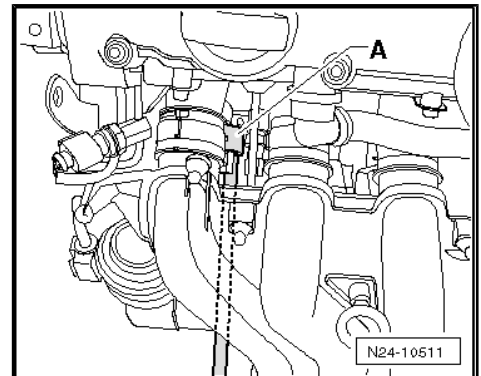
- Disconnect hoses and the plug from the vacuum reservoir -A- and remove the reservoir.



- Unlock and disconnect plug of fuel pressure sender - G247- with the assembly tool - T10118- -arrow-.



- First, place the open ring spanner -A- on the fuel pressure sender - G247- . Then insert an extension into the open ring spanner.
- Unscrew the fuel pressure sender - G247- .



#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Moisten thread and cone of the fuel pressure sender - G247- with clean engine oil.

Tightening torque: 22 Nm

## 5.5 Removing and installing intake manifold, engine identification characters BWA

### Special tools and workshop equipment required

- ◆ Pliers for spring strap clamps



#### Note

- ◆ *Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ⇒ [page 4](#) .*
- ◆ *Use the summaries of components on the previous pages ⇒ [page 235](#) .*





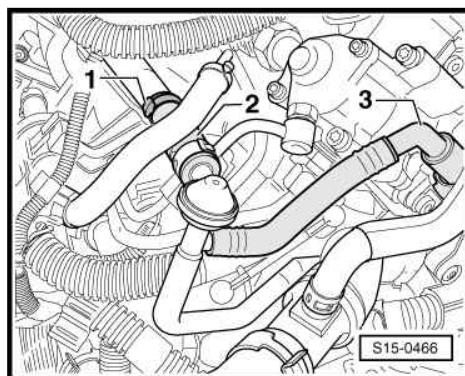
## Removing



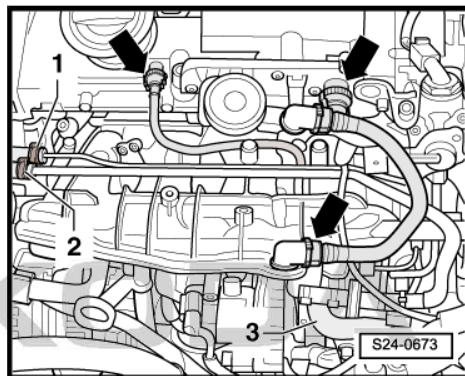
### WARNING

*Relieve pressure in the high pressure system ➔ [page 5](#) .*

- Switch off ignition and all electrical loads, and pull out ignition key.
- Remove throttle flap control unit - J338- ➔ [page 257](#) .
- Open the clamp -1- and detach the hose -2- from the intake manifold.
- Detach the vacuum line -3- from the vacuum pump.

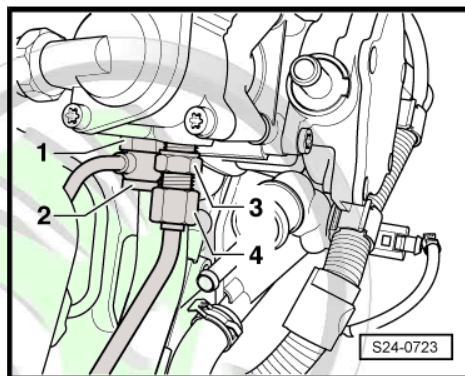


- Disconnect the pipe/hose connections -arrows-.
- Mark lines and remove the spring-type clips -1- and -2-.
- Disconnect lines (catch escaping fuel).
- Remove pipe -3- from the oil filter holder and take out upwards.



### Vehicles up to 03.2006

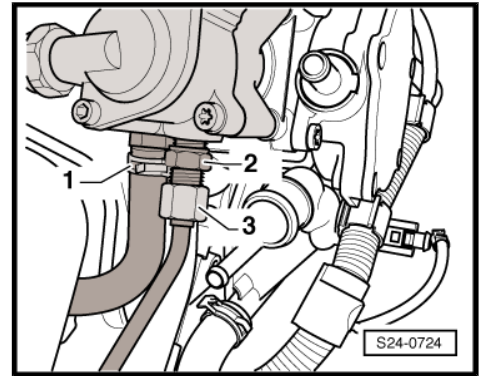
- Unscrew fuel pipe -4- from connector -3-. Counterhold connector -3- while doing so.
- Unscrew hollow bolt -2- on the high pressure pump. Counterhold connector -1- while doing so.



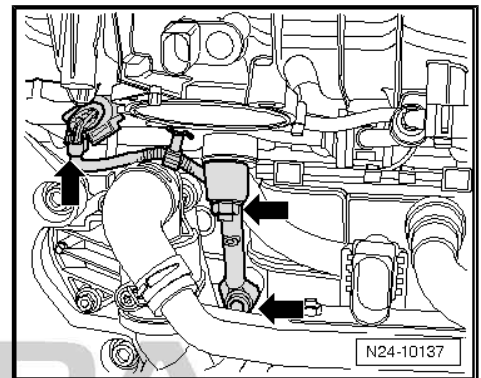
## Vehicles as of 04.2006

- Open spring-type clip -1- and detach fuel hose.
- Unscrew fuel pipe -3- from connector -2-. Counterhold connector -2- while doing so.

### Continued for all vehicles



- Remove intake manifold support -right arrows- e.g. with tool XZN 10 (length: 120 mm), commercially available.
- Disconnect the plug -left arrow- from the fuel pressure sender - G247- .
- Unscrew all bolts and nuts from the intake manifold.
- Carefully remove the intake manifold with fuel distributor from the cylinder head.



### Note

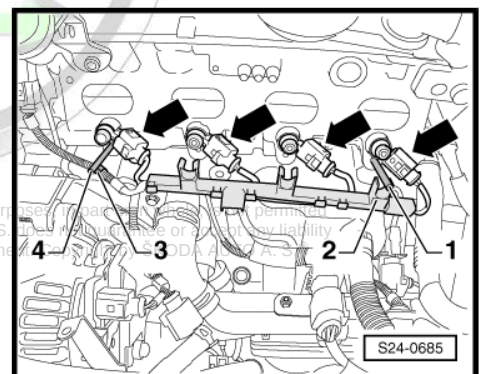
- ◆ *If one or more injection valves remain stuck in the in the intake manifold, the plug connections must be disconnected at the injection valves.*
- ◆ *If injection valves remain stuck in the intake manifold, the combustion chamber sealing ring (Teflon) and the O-ring must be replaced for these injection valves ⇒ [page 255](#) .*

- Remove fuel distributor ⇒ [page 251](#) .

### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Install injection valves ⇒ [page 253](#) .
- Replace seal for intake manifold.
- Connect plugs -arrows- to the injection valves.
- Position cable rail -2- with the left mounting in front of the threaded pin -1-.
- Place intake manifold approx. 1 cm down onto the threaded pins -1- and -4-.
- Slide cable rail -2- onto the three sleeves of the intake manifold.



### Note

*Check at the sleeve of the threaded pin -1- that the cable rail had been pushed on.*

- Slide intake manifold all the way onto the threaded pins -1- and -4-.
- Secure clip -3- to the right sleeve of the intake manifold (at threaded pin -4-).



- Install pipe -3- and attach to oil filter holder.
- Installing the intake manifold ⇒ [page 235](#) .

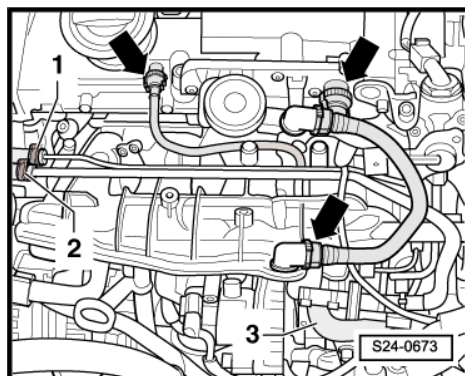


### Note

*Before installing the fuel pipes, check the applicable screw connector on the high-pressure pump has the correct torque.*

- ◆ High pressure connection piece: 40 Nm
- ◆ Low pressure connection piece (vehicles up to 03.2006): 30 Nm
- Fit fuel pipes to high-pressure pump ⇒ [page 239](#) (replace hollow bolt).

If the intake manifold flap motor - V157- or the intake manifold has been replaced, the intake manifold flap potentiometer - G336- must be adapted to the engine control unit ⇒ Vehicle diagnostic tester.



## 5.6 Removing and installing intake manifold flap motor - V157- with intake manifold flap potentiometer - G336-

### Special tools and workshop equipment required

- ◆ Assembly device - T10118-
- ◆ Commercially available 1/4" bit reversible ratchet
- ◆ Insert bit T30

### Removing

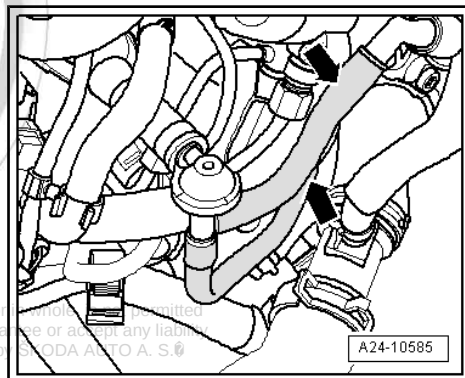
- Remove engine cover (air filter) ⇒ [page 242](#) .
- Detach vacuum lines -arrows-.
- Disconnect following plugs:



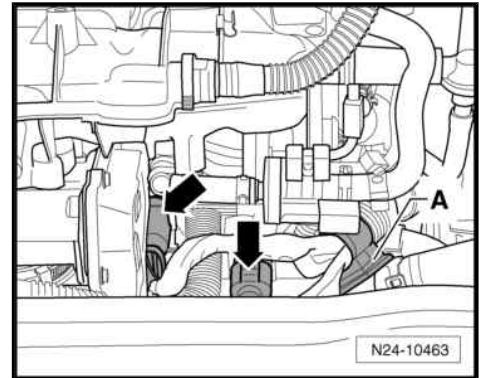
### Note

*Hard-to-access plugs can be opened more easily with the assembly tool - T10118- .*

- ◆ Plug for intake manifold flap motor - V157-
- ◆ Plug for activated charcoal filter solenoid valve 1 - N80-
- ◆ Plug for intake manifold pressure sender - G71-
- ◆ Plug for throttle valve control unit - J338 -
- ◆ Plug for fuel pressure sender for low pressure - G410-



- Also disconnect the plug connections -arrows-.
- Detach cable holder -A- and place entire wiring harness to the side.

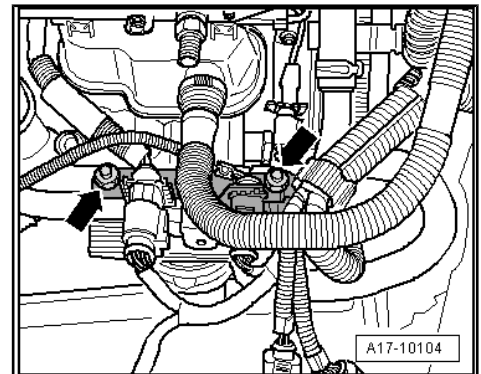


- Unscrew mount for the plugs -arrows- from the coolant pipe.



#### Note

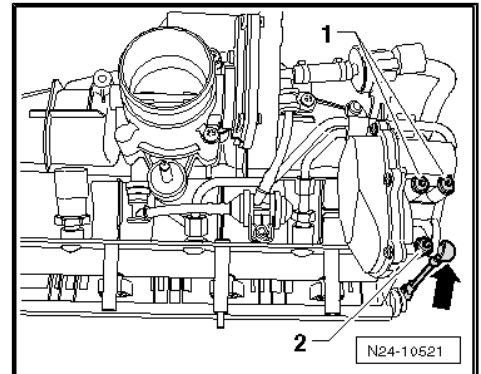
*The nut -left arrow- only needs to be loosened until the mount can be swivelled to the side.*



- Lever the coupling rod -arrow- off the intake manifold flap motor - V157- .
- Unscrew bolts -1- and -2- »from above« with 1/4" bit reversible ratchet and insert bit T30 .
- Remove intake manifold flap motor - V157- from intake manifold.

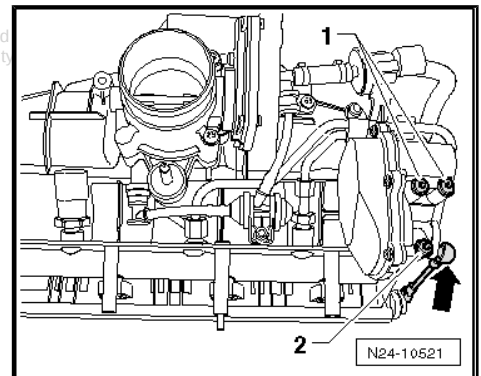
#### Install

Installation is carried out in the reverse order. When installing, observe the following:



- Fit bolts -1- and -2- by hand to avoid damaging the threads.

If the intake manifold flap motor - V157- or the intake manifold has been replaced, the intake manifold flap potentiometer - G336- must be adapted to the engine control unit ⇒ Vehicle diagnostic tester.



## 5.7 Removing and installing fuel distributor, engine identification characters BWA

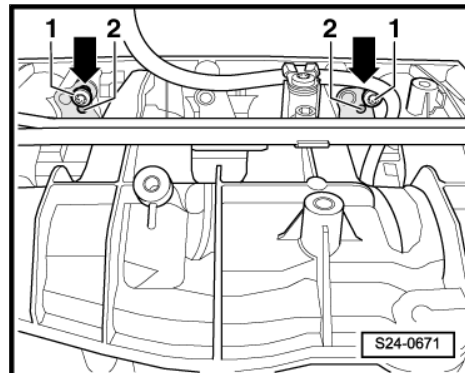
### Removing

- Removing the intake manifold ⇒ [page 243](#) .





- Unscrew screws -1-.
- Lever the fuel distributor -arrows- off the two pins -2-.

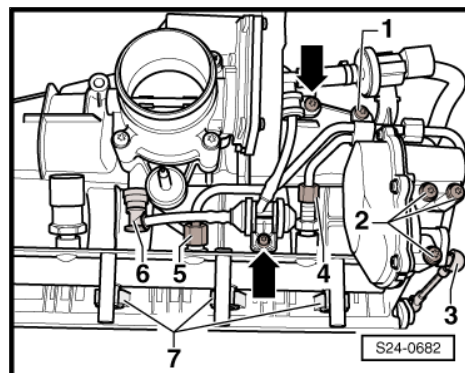


- Unscrew both screws -arrows- at the bottom.
- Pull hose connection -6- off intake manifold.
- Unscrew bolt -1- and the union nut -4-. Counterhold pressure limiting valve while doing so.
- Unscrew union nut -5-.



#### Note

On vehicles as of 04.2006, counterhold the screw connector while doing so.



- Carefully lever linkage -3- of the intake manifold flap motor - V157- .
- Unscrew bolts -2- and remove the intake manifold flap motor - V157- .
- Pull fuel distributor out of the mountings -7- of the intake manifold.

#### Install

Installation is carried out in the reverse sequence.

- ◆ Before installing the low pressure pipe, check the pressure limiting valve in the fuel distributor is at a torque of 30 Nm.
- ◆ On vehicles as of 04.2006, before removing the high pressure tube, check that the screw connector in the fuel distributor has a tightening torque of 30 Nm.
- ◆ Tightening torques: ➔ [page 236](#)

## 5.8 Removing and installing fuel pressure sender - G247- , engine identification characters BWA

#### Special tools and workshop equipment required

- ◆ Assembly device - T10118-
- ◆ Socket wrench insert 27 mm , e.g. -VAS 5301/7-



#### Note

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Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ➔ [page 4](#) .



## Removing



### WARNING

*Relieve pressure in the high pressure system ➔ [page 5](#).*

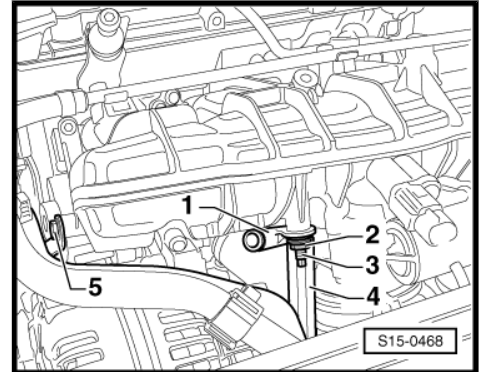
- Unscrew bolt -5- and nut -2-.
- Pull coolant pipe -5- off the stud -3-.
- Unscrew stud -3-.
- Pull funnel -1- ( ➔ [page 117](#) , Pos. 3) upwards off the guide tube ( ➔ [page 117](#) , Pos. 4)



### Note

*If it does not come off easily, press off from below with a suitable tool.*

- Unlock plug from the fuel pressure sender - G247- with the assembly tool - T10118- .
- Unscrew the fuel pressure sender - G247- with socket wrench insert 27 mm .



## Install

Installation occurs in reverse order to removal.

- Moisten cone of the fuel pressure sender - G247- with clean engine oil.

Moisten thread and cone of the fuel pressure sender - G247- with clean engine oil.

Tightening torque: 22 Nm

## 5.9 Removing and installing injectors

### Special tools and workshop equipment required

- ◆ Set of tools - T10133-





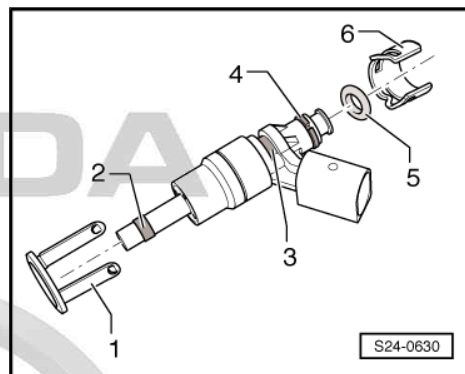
### Injection valve - individual parts

- 1 - Radial compensation element; replace if damaged.
- 2 - Combustion chamber sealing ring (Teflon seal); replace.



#### Caution

- ◆ *When installing, the combustion chamber sealing ring/ Teflon seal must not be greased or treated with any other lubricant.*



- 3 - Groove on injection valve.
- 4 - Supporting washer, replace.
- 5 - O-ring, replace. Before installing, moisten lightly with clean engine oil.
- 6 - Support ring

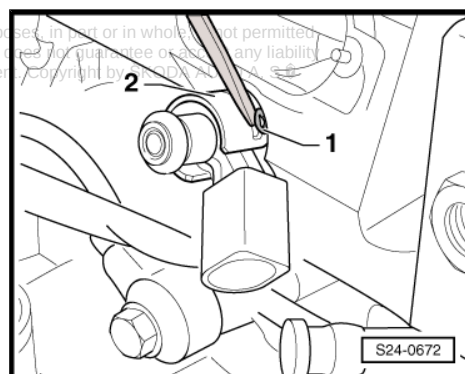
### Removing

- Remove the intake manifold.
- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ ➔ [page 243](#)
- ◆ Engine identification characters BWA: ➔ [page 247](#)
- Break off the plastic retaining tab -1-, of the radial compensation element with a screwdriver and pull the support ring -2- off the injection valve.



#### Note

- ◆ *If the radial compensation element is of metal design, bend the retaining tab inwards.*
- ◆ *The radial compensation element must always be replaced before the injection valve is re-installed.*
- Screw striking hammer - T10133/3- with extractor - T10133/2A- . Then insert the extractor - T10133/2A- into the groove on injection valve and carefully hammer out the injection valve.

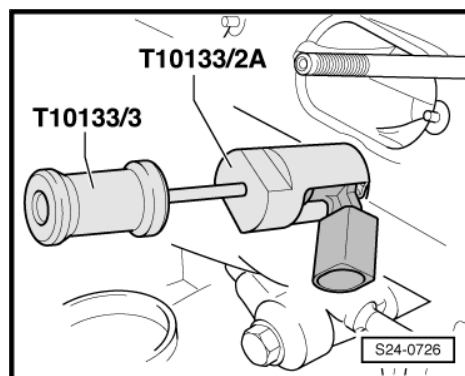


### Install



#### Caution

*When installing, the combustion chamber sealing ring/ Teflon seal must not be greased or treated with any other lubricant.*



#### Note

*An opened induction valve may impede cleaning. In this case, turn the engine further from the c-spanner by hand using a spanner.*

- Thoroughly clean the holes of the high-pressure injection valves in the cylinder head with the nylon brush - T10133/4- .
- Replace O-ring and the Teflon seal of the injection valve  
⇒ [page 255](#) .

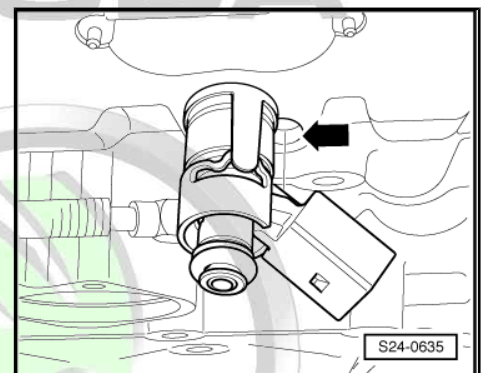
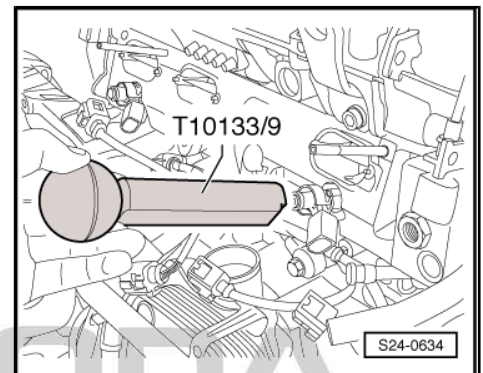
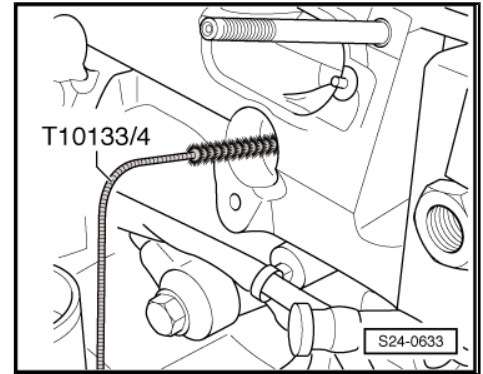


**Note**

*The injection valve must insert easily, if necessary wait until the gasket ring has been drawn together sufficiently.*

- Use the assembly drift - T10133/9- to press the injection valve into the bore hole in the cylinder head as far as it goes.

- Pay attention to the correct position of the injection valves in the cylinder head -arrow-.
- If the injection valves has been replaced, erase the initialisation values and adapt the engine control unit again ⇒ Vehicle diagnostic tester.



## 5.10 Replacing Teflon seal on injection valve

### Prerequisite

- Injection valve removed ⇒ [page 253](#)

### Special tools and workshop equipment required

- ◆ Set of tools - T10133-



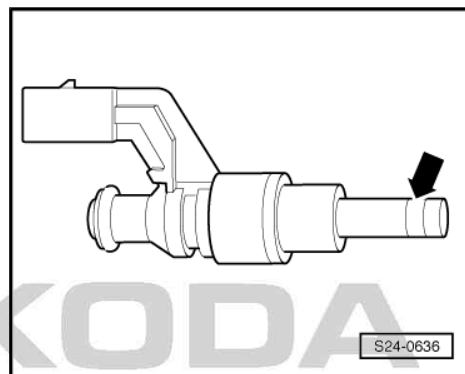
**Caution**

*The Teflon seal must not be oiled.*

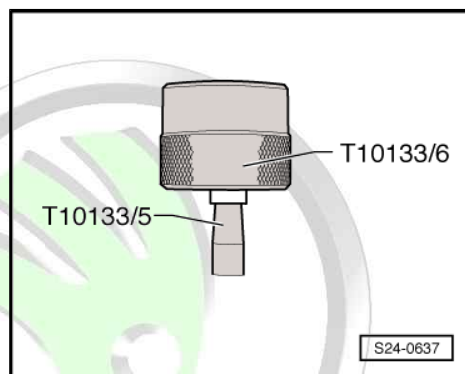
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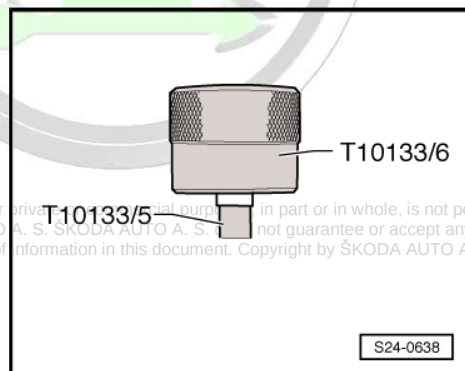
- Carefully clean the injection valve in the area of the gasket ring -arrow-. Remove the existing deposits (carbon deposits) with a wire brush.
- Carefully cut open gasket ring with a knife.
- Clean the seal groove.



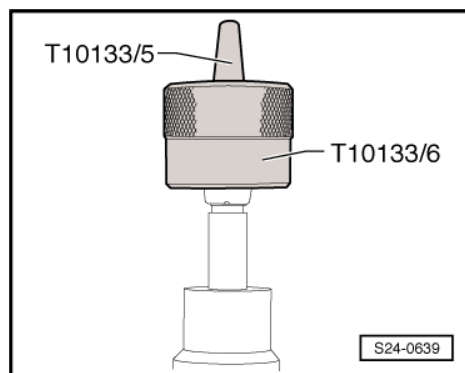
- Fit a new sealing ring onto the assembly cone - T10133/5- . Slide the sealing ring with the assembly sleeve - T10133/6- as far onto the assembly cone - T10133/5- as possible.



- Turn the assembly sleeve - T10133/6- and slide the sealing ring right onto the assembly cone - T10133/5- .

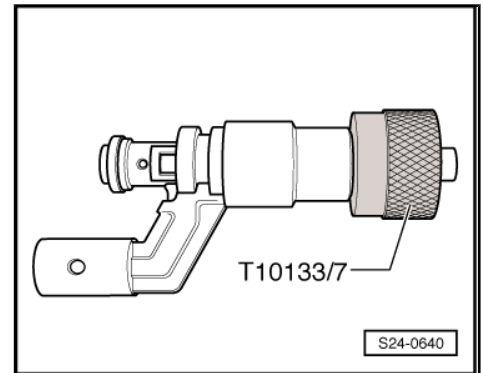


- Position the assembly cone - T10133/5- onto the injection valve and slide the sealing ring with the assembly sleeve - T10133/6- onto the injection valve.
- Remove the assembly cone - T10133/5- and slide the sealing ring with the assembly sleeve - T10133/6- until it is in the groove.

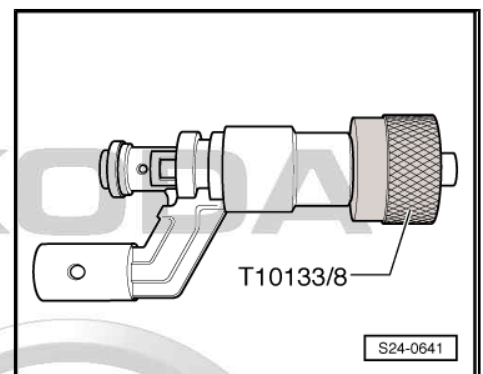


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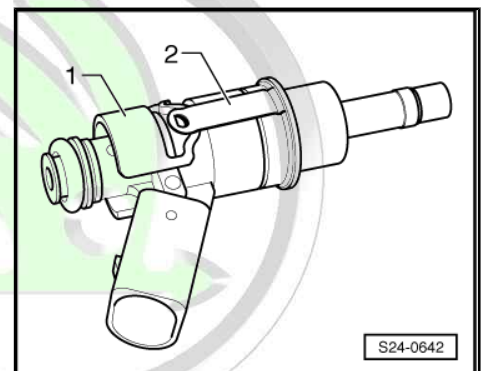
- Next, press the calibrating sleeve - T10133/7- with a slight turn (approximately 180°) up to the stop onto the injection valve.
- Remove calibrating sleeve - T10133/7- again in the opposite direction of rotation.



- Next, press the calibrating sleeve - T10133/8- with a slight turn (approximately 180°) up to the stop onto the injection valve.
- Remove calibrating sleeve - T10133/8- again in the opposite direction of rotation.
- Replace O-ring on injection valve and the support washer.



- Fit support ring -1- back onto injection valve and clip the radial compensation element -2- onto the support ring.



## 5.11 Removing and installing throttle valve control unit - J338- , engine identification characters BWA

### Removing

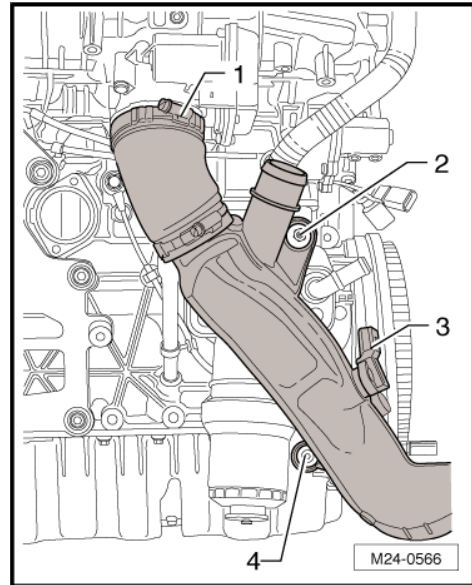
- Remove engine cover ➔ [page 242](#) .
- Remove fan shroud with radiator fans ➔ [page 158](#) .

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- Disconnect plug from charge pressure sender - G31- -3-.
- Unscrew screws -2- and -4-.
- Release clamp -1-, disconnect the quick coupler from the charge air cooler and remove the charge air pipe with the hose downwards.

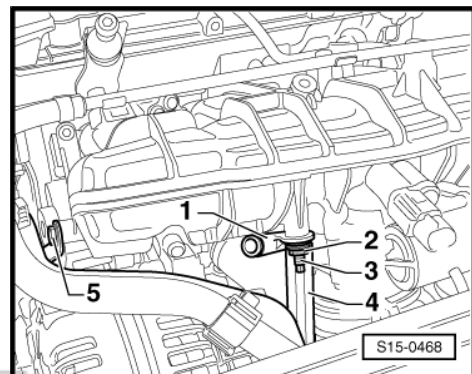


- Unscrew bolt -5- and nut -2-.
- Remove coolant pipe from the threaded pin -3-.
- Unscrew stud -3-.
- Pull funnel -1- ( ➤ [page 117](#) , Pos. 3) upwards off the guide tube ( ➤ [page 117](#) , Pos. 4)



#### Note

*If it does not come off easily, press off from below with a suitable tool.*



- Disconnect plug connection from the throttle valve control unit.
- Unscrew the 4 bolts of the throttle flap control unit - J338- and remove the throttle valve control unit.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- ◆ After replacing the throttle valve control unit, erase adapted values and adapt engine control unit to the throttle flap control unit ➔ Vehicle diagnostic tester.

## 5.12 Clean throttle valve control unit - J338-

Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ



#### Note

*If a new engine control unit is fitted, the throttle valve control unit must be adapted. The adaptation must only be carried out with a new or cleaned throttle valve control unit, because dirt/carbon deposits in the end stop of the throttle valve can lead to incorrect adaptation values.*

- Detach air filter housing and pull intake hose off the throttle valve housing.

### Vehicles with engine identification characters BLR, BLX, BLY

- Clamp off coolant hoses at the throttle valve control unit with the hose clamps up to Ø 25 mm - MP7-602- .
- Detach the coolant hoses from the throttle valve control unit.

#### Continued for all vehicles

- Remove throttle valve control unit.
- ♦ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ ➔ [page 228](#)
- ♦ Vehicles with engine identification characters BWA:  
➔ [page 257](#)

#### Note

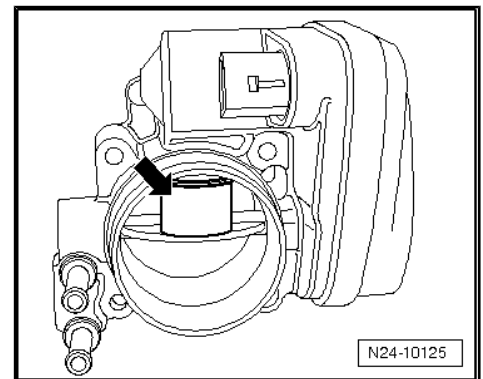
*The throttle valve support must not be scratched when cleaning.*

- Open the throttle valve manually and block the throttle valve in the opened position with a suitable object -arrow-.



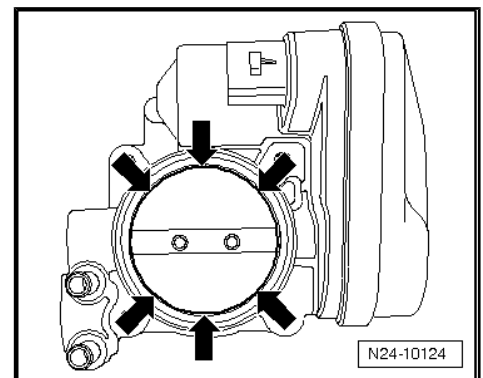
#### WARNING

**Acetone is easily inflammable. Observe accident prevention regulations and safety notes when handling highly inflammable fluids. Do not use compressed air when cleaning the throttle valve. Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel.**



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- Thoroughly clean the throttle valve support, in particular the area of the closed throttle valve -arrows-, with commercially available acetone and a paint brush.
- Wipe the throttle valve support with a non-fluffy cloth.
- Let the acetone dry off completely and re-install the cleaned throttle valve control unit.
- Adapt the engine control unit to the throttle valve control unit  
➔ Vehicle diagnostic tester.



## 5.13 Removing and installing high-pressure pump, engine identification characters BLR, BLX, BLY, BVX, BLY, BVZ

#### Note

- ♦ *The high pressure pump must not be disassembled!*
- ♦ *Safety precautions when working on the fuel supply system*  
➔ [page 4](#) .
- ♦ *Observe cleanliness requirements when working on the fuel system* ➔ [page 6](#) .



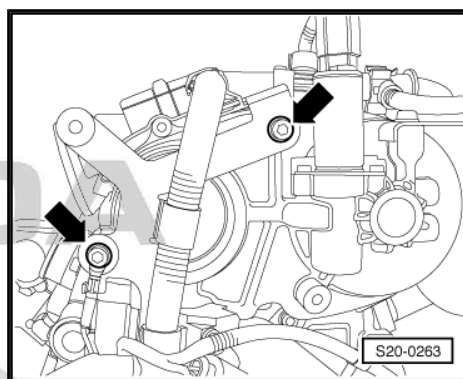
## Removing



### WARNING

*Relieve pressure in the high pressure system ➔ [page 5](#) .*

- Removing the intake manifold ➔ [page 243](#) .
- Position camshaft sprocket to TDC marking for cylinder 1 by rotating at crankshaft.
- ◆ Engines without split toothed belt guard: ➔ [page 40](#)
- ◆ Engines with split toothed belt guard: ➔ [page 50](#)
- Remove the high pressure and low pressure tubes. When loosening the connections, counterhold applicable screw connector.
- Unscrew bolts -arrows- of cable holder.



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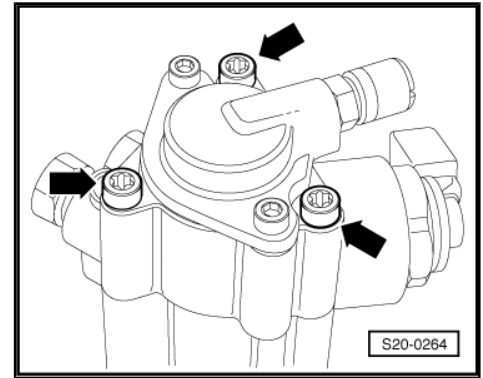
- Remove high pressure pump -arrows-.
- Take tappet ( ➔ [page 233](#) Pos. 1) out of the pump housing.

#### Install



#### Note

- ◆ *The high-pressure pump must be fitted with securing bolts already inserted.*
- ◆ *The seal of the fuel pipes and connection fittings must not be damaged.*
- ◆ *The hollow bolts for the fuel pipes must be replaced.*
- ◆ *The fuel pipes must be installed free of stress.*
- Replace the sealing ring of the high-pressure pump and moisten lightly with clean engine oil.
- Check the tappet ( ➔ [page 233](#) Pos. 1) for damage and insert it into the cylinder head.
- Carefully position the high-pressure pump on the cylinder head and tighten the bolts hand-tight.



#### Note

*Before installing the fuel pipes, check the applicable screw connectors have the correct torque.*

- ◆ High-pressure connector in high pressure pump . 40 Nm
- ◆ Low-pressure connector in high pressure pump . 30 Nm
- ◆ Pressure limiting valve in fuel distributor: 30 Nm
- Install fuel pipes with new hollow bolts. Only tighten bolts hand-tight.
- Tighten securing bolts of the high-pressure pump to 10 Nm.
- Then tighten the bolts/union nuts -1- to -5- in the following order:

1 - Securing bolts -1- to 10 Nm

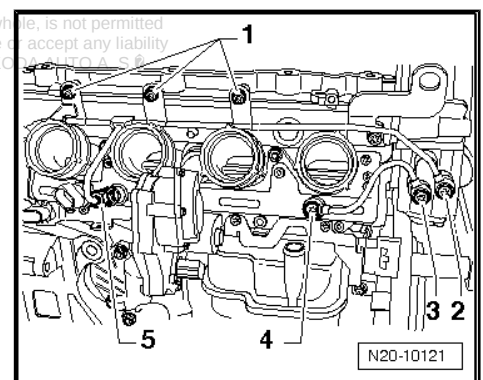
2 - Hollow bolt -2- to 15 Nm

3 - Hollow bolt -3- to 15 Nm

4 - Hollow bolt -4- to 15 Nm

5 - Union nut -5- to 22 Nm

- Installing the intake manifold ➔ [page 243](#) .





## 5.14 Removing and installing high-pressure pump, engine identification characters BWA



### Note

- ◆ The high pressure pump must not be disassembled!
- ◆ Observe the safety instructions before starting fitting work ➔ [page 4](#) .
- ◆ Observe rules for cleanliness ➔ [page 6](#) .

### Removing



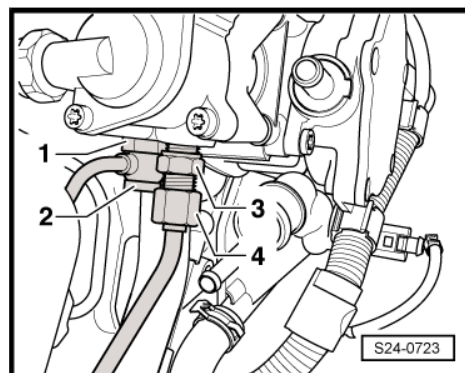
### WARNING

Relieve pressure in the high pressure system ➔ [page 5](#) .

- Remove engine cover ➔ [page 242](#) .
- Position camshaft sprocket to TDC marking for cylinder 1 by rotating at crankshaft.
- ◆ Engines without split toothed belt guard: ➔ [page 40](#)
- ◆ Engines with split toothed belt guard: ➔ [page 50](#)

### Vehicles up to 03.2006

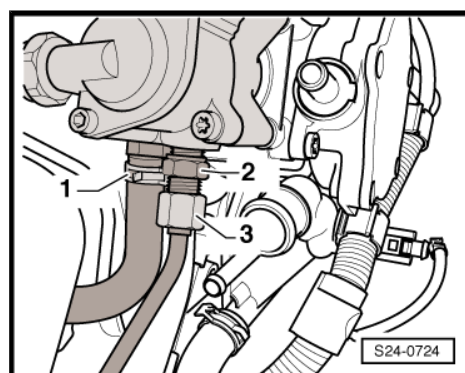
- Unscrew fuel pipe -4- from connector -3-. Counterhold connector -3- while doing so.
- Unscrew hollow bolt -2- on the high pressure pump. Counterhold connector -1- while doing so.



### Vehicles as of 04.2006

- Open spring-type clip -1- and detach fuel hose.
- Unscrew fuel pipe -3- from connector -2-. Counterhold connector -2- while doing so.

### Continued for all vehicles





- Disconnect plug connection -1-.
- Unscrew bolts -arrows- and carefully remove the high pressure pump.

**i** Note

*The tappet ( ➡ [page 239](#) , Pos. 1) may remain stuck in the cylinder head under certain circumstances.*

**Install**

**i** Note

- ◆ *The seal of the fuel pipes and connection fittings must not be damaged.*
- ◆ *The hollow bolt for the fuel pipe (vehicles up to 03.2006) must be replaced.*
- ◆ *Do not install fuel pipes under tension.*
- Replace the O-ring of the high-pressure pump and moisten lightly with clean engine oil.
- Check the tappet ( ➡ [page 239](#) Pos. 1) for damage and insert it into the cylinder head.
- Carefully position the high-pressure pump on the cylinder head and tighten the bolts hand-tight -arrows-.

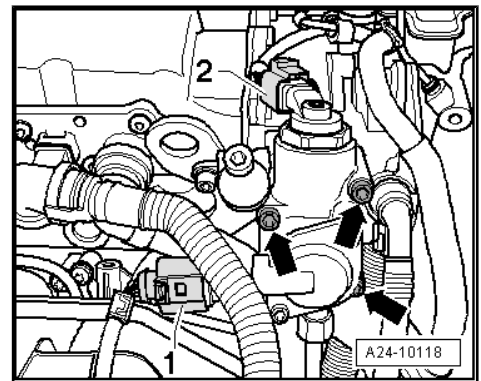
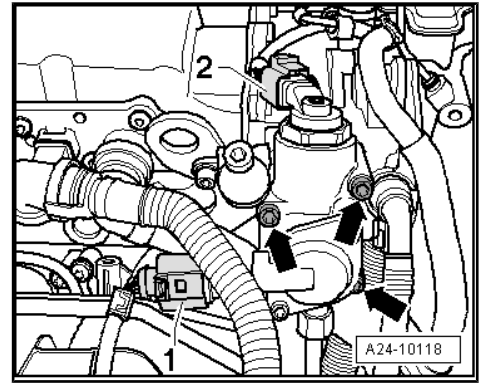
**i** Note

*Before installing the fuel pipes, check the applicable screw connectors on the high-pressure pump have the correct torque.*

- ◆ High pressure connection piece: 40 Nm
- ◆ Low pressure connection piece (vehicles up to 03.2006): 30 Nm
- Screw in fuel pipes hand-tight.
- Then tighten bolts and fuel pipes to the required tightening torque ➡ [page 239](#) .

Further assembly occurs in reverse order.

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## 6 Testing components

### 6.1 Check intake manifold change-over, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### Special tools and workshop equipment required

- ♦ Hand vacuum pump , e.g. -V.A.G 1390- or -VAS 6213-



#### Note

Observe all safety measures and notes for assembly work on the fuel system, on the injection and ignition system as well as rules for cleanliness ➔ [page 4](#) .

Only carry out the check when there is a torque deficiency. This means there is a lack of elasticity or pulling power.

#### Test condition

- The valve for variable intake manifold changeover - N156- has been tested with the ➔ Vehicle diagnostic tester.

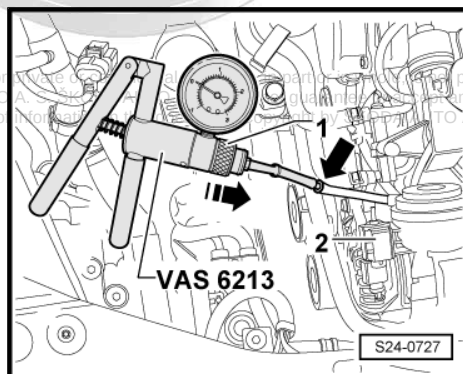
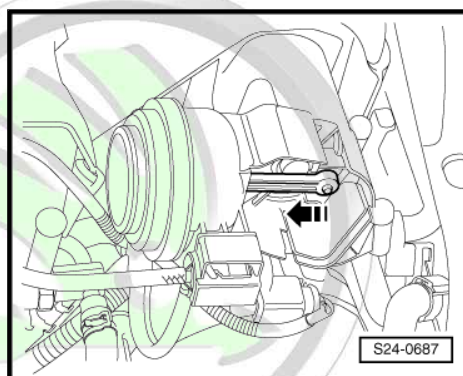
#### Test sequence

If the valve for variable intake manifold changeover - N156- is OK, perform the following steps:

- Remove cover on vacuum unit.
- Start engine and run in idle.
- Have a 2nd person increase the engine speed suddenly (step on accelerator). Note the vacuum positioning element for intake manifold change-over.
- The setting rod must move in the -direction of arrow-.

If the change-over does not work as indicated:

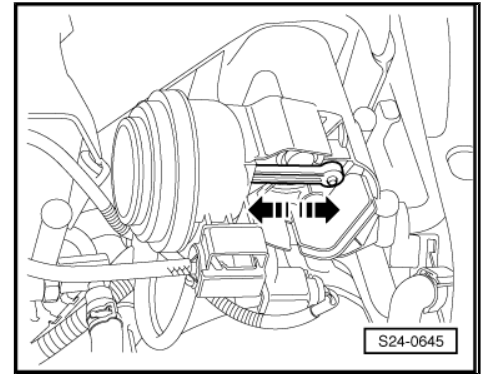
- Check vacuum system including vacuum reservoir on intake manifold for leaks.
- Check the change-over mechanism for ease of movement. To this end activate the linkage by hand.
- Inspect vacuum lines to see that they are connected properly.
- Check vacuum hoses for porosity.
- Detach the vacuum hose for the actuator for the valve for variable intake manifold changeover -arrow- from the valve for variable intake manifold changeover - N156- -2-.
- Connect the hand vacuum pump - VAS 6213- to the actuator for the valve for variable intake manifold changeover.
- Slide the sliding ring -1- of the hand vacuum pump - VAS 6213- in the -direction of arrow- for "vacuum".



- Operate hand vacuum pump - VAS 6213- several times.
- The vacuum positioning element must move -arrows-.

If the vacuum setting element does not move:

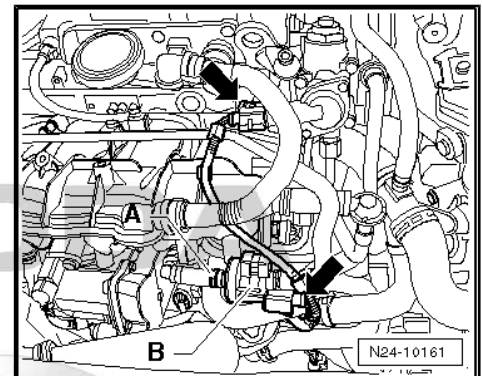
- replace the vacuum setting element.



## 6.2 Checking the double non-return valve, engine identification characters BWA

### Special tools and workshop equipment required

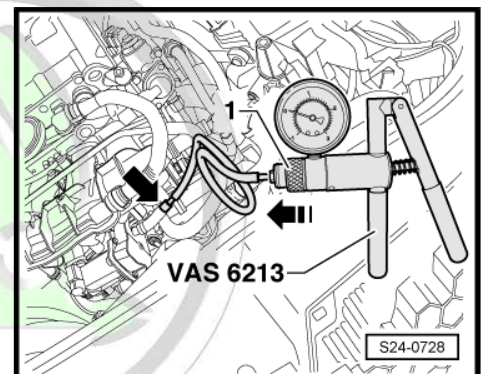
- ◆ Hand vacuum pump , e.g. -V.A.G 1390- or -VAS 6213-
- Remove engine cover ➔ [page 242](#) .
- Disconnect plug from activated charcoal filter solenoid valve 1 - N80- and fuel pressure sender - G410- -arrows-.
- Disconnect activated charcoal filter solenoid valve 1 - N80- -B- from the hose -A-.



- Connect hand vacuum pump - VAS 6213- to hose to double non-return valve -arrow-
- Slide the sliding ring -1- of the hand vacuum pump - VAS 6213- in the -direction of arrow- for “vacuum”.
- Operate hand vacuum pump - VAS 6213- several times.
- A vacuum should build up.

If no vacuum builds up:

- Replace double non-return valve.



## 6.3 Check fuel pressure sender - G247-

### Special tools and workshop equipment required

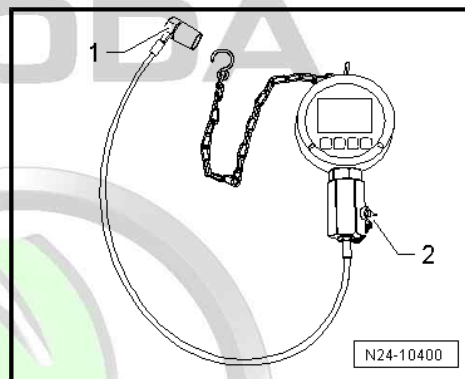
- ◆ Tester for pressure sensor e.g. -VAS 6394- by ŠKODA AUTO A. S. ŠKODA AUTO A. S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by ŠKODA AUTO A. S.
- ◆ Test adapter - VAS 5570-

### Work procedure

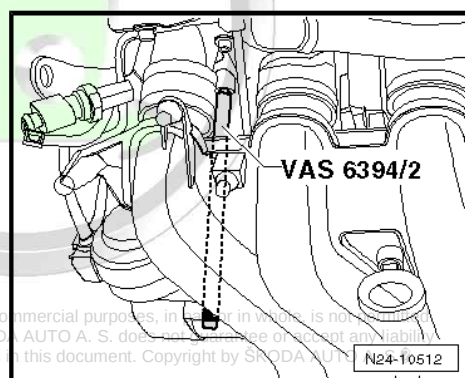
- Remove fuel pressure sender - G247- .
- ◆ Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ ➔ [page 246](#)
- ◆ Engine identification characters BWA: ➔ [page 252](#)



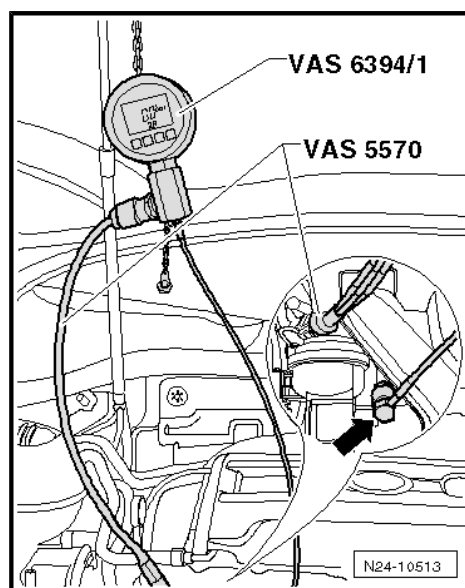
- Release the screw plug -2- and screw the fuel pressure sender - G247- into the tester - VAS 6394/1- . Tightening torque 22 Nm.



- Moisten the sealing cone of the adapter - VAS 6294/2- with clean engine oil and screw it into the fuel distributor. Tightening torque: 22 Nm



- Connect the pressure line of the tester - VAS 6394/1- to the adapter - VAS 6394/2 - -arrow-.
- Use the test adapter - VAS 5570- to connect the fuel pressure sender and the plug of the fuel pressure sender .

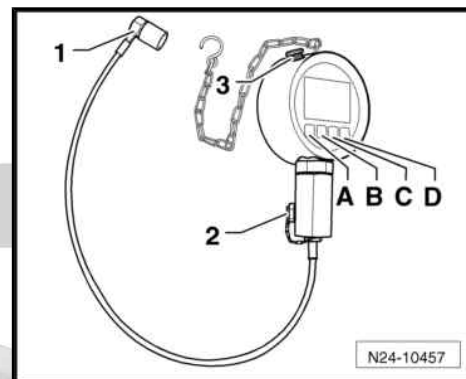


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- Switch on the tester - VAS 6394/1- , for this step, briefly press the button -A- once.

**i Note**

- ♦ If the button -A- is pressed for 2 seconds, the illumination is switched on for 20 seconds.
- ♦ If the tester - VAS 6394/1- does not indicate 0 MPa (0 bar), carry out a zero point of the balance by means of the ⇒ operating instructions .



- Connect vehicle diagnosis, measurement and information system to the diagnostic connection.
- Switch on ignition.
- On the display of the vehicle diagnosis, measurement and information system , press the following buttons in order:

Vehicle self-diagnosis

Self-diagnosis ►

01 - Engine Electronics ►

011 - Measured values ►

- Select measured value block 1 4 0 and confirm with 0.

In the display field 3, the fuel pressure (actual value) is shown, measured by the fuel pressure sender - G247- .

- Start engine.
- Compare the pressure displayed by the tester - VAS 6394/1- with the actual value displayed on the vehicle diagnosis, measurement and information system .
- The pressures may deviate maximum 0.5 MPa (5 bar) from one another.
- If the deviation is greater than 0.5 MPa (5 bar), replace the fuel pressure sender - G247- .



**WARNING**

*The tester - VAS 6394- is under high fuel pressure! Disconnect the plug from the fuel pressure sender - G247- while the engine is running. Thereby the fuel pressure is reduced to approx. 0.6 MPa (6 bar). Switch off ignition. Place a cleaning cloth around the fuel pressure sender - G247- , then reduce the remaining pressure by carefully loosening the fuel pressure sender - G247- .*

- Repeat the test with the new fuel pressure sender - G247- and compare both measured values.

**If the measured values do not correspond again:**

- Perform a cable testing ⇒ Vehicle diagnostic tester.





## 7 Engine control unit

### 7.1 Removing and installing engine control unit

#### Special tools and workshop equipment required

- ♦ Body saw, e.g. -V.A.G 1523 A-



#### Note

- ♦ *If the engine control unit is replaced, the vehicle diagnosis, measurement and information system - VAS 5051B- must be connected and the function "replace engine control unit" must be carried out.*
- ♦ *If the engine control unit is replaced on vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ, the throttle valve control unit - J338- must be cleaned before adaptation ➔ [page 258](#) .*

#### Removing

- Switch off ignition.
- Remove the cooling water tank cover ➔ Body Work; Rep. gr. 66 .
- Remove bulkhead plenum chamber.
- Removing windscreen wiper and washer system ➔ Electrical System; Rep. gr. 92 .

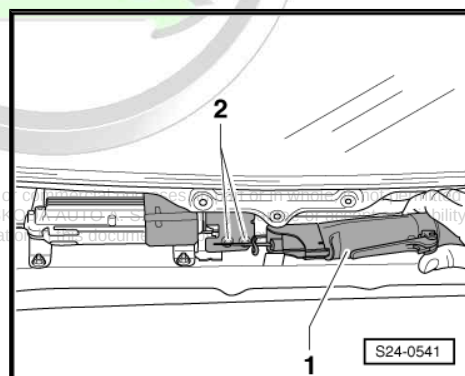
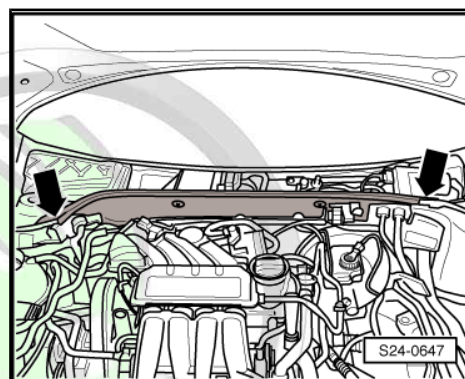
#### Vehicles with protective cover

- Cut with body saw -1- a slot for the cross-head screwdriver in the heads of the pull-off screws -2-.



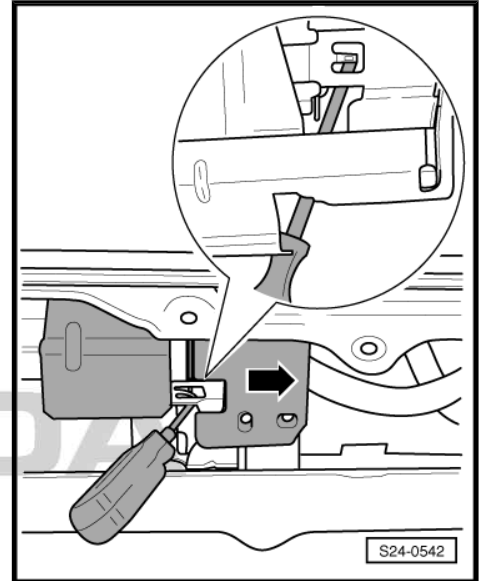
#### Note

- ♦ *It must be sawed twice with the body saw, so that the slot is wide enough, in order to unscrew the screws with a suitable screwdriver.*
- ♦ *The pull-off screws until are inserted with locking agent.*
- Screw out the screws.



- Lift locking tab of protective cover with a cross-head screw-driver.
- Push the protective cover in the -direction of the arrow- out of the bracket for engine control unit.

**Continued for all vehicles**



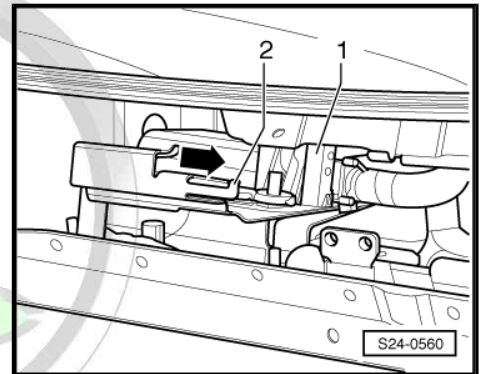
- Unlock and disconnect the front plug -1- on the engine control unit.
- Lever off the securing clip -2- slightly.
- Push engine control unit out of the bracket -arrow-.
- Unlock and disconnect the rear plug on the engine control unit.

**Install**



**Note**

*For vehicles with protective cover, the metal swarfs must be suctioned out of the plenum chamber before installing the engine control unit.*



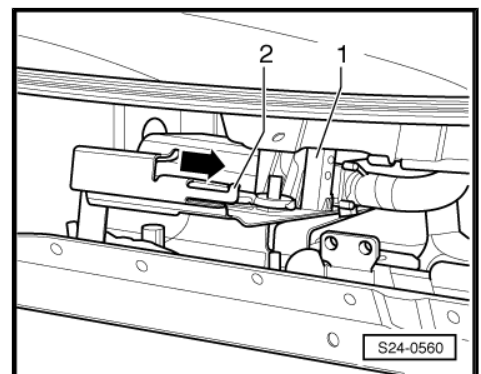
- Connect and lock the rear plug on the engine control unit.
- Push the engine control unit onto the retaining plate.
- Press securing clip -2- in engine control unit.
- Connect and lock the front plug -1- on the engine control unit.

**Vehicles with protective cover**

- Fasten protective cover with new pull-off screws.
- Tighten pull-off screws evenly until the screw heads are pulled off.

**Continued for all vehicles**

- Installing windscreen wiper and washer system ⇒ Electrical System; Rep. gr. 92 .
- Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work; Rep. gr. 66 .





## 26 – Exhaust system

### 1 Exhaust system, engine identification characters BLR, BLX, BVY, BVX - summary of components

Engine identification characters BLR, BVY: Only vehicles with front-wheel drive

Engine identification characters BLX, BVX: only four-wheel drive vehicles

#### 1.1 Exhaust manifold with catalytic converter - summary of components

Positions -1- to -4- are not installed for engine identification characters BVY.

1 - Clamp

2 - 10 Nm

3 - Cable guide

- ☐ for lambda probe

4 - Lambda probe 2 - G108- , 55 Nm

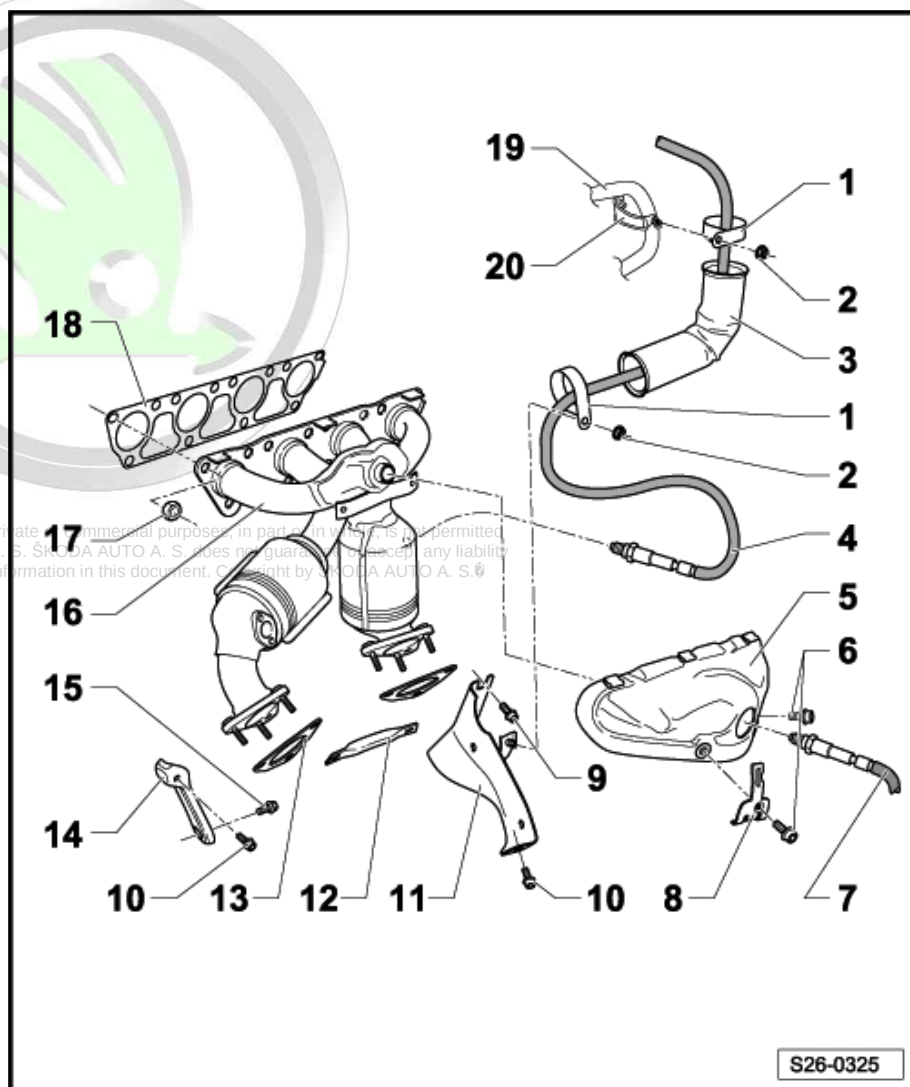
- ☐ in front of the catalytic converter, left arm of exhaust pipe
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body
- ☐ Colour of the plug: Brown

5 - Protection plate

6 - 10 Nm

7 - Lambda probe - G39- , 55 Nm

- ☐ in front of the catalytic converter, right arm of exhaust pipe
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body
- ☐ Colour of the plug: black



**8 - Cable strap**

**9 - 40 Nm**

**10 - 23 Nm**

**11 - Support for exhaust manifold**

- ☐ right

**12 - Strut**

- ☐ between the flanges

**13 - Gasket**

- ☐ replace

**14 - Support for exhaust manifold**

- ☐ left

**15 - 25 Nm**

**16 - Exhaust manifold with catalytic converter**

- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.
- ☐ removing and installing ⇒ [page 281](#)

**17 - 25 Nm**

- ☐ replace
- ☐ Coat stud bolts in the cylinder head with hot bolt paste - G 052 112 A3-

**18 - Gasket**

- ☐ replace

**19 - Bottom connection pipe**

- ☐ from exhaust gas recirculation

**20 - Support**

- ☐ for cable guide clip



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## 1.2 Exhaust system - summary of components, vehicles with front-wheel drive (BLR, BVY)

### 1 - 25 Nm

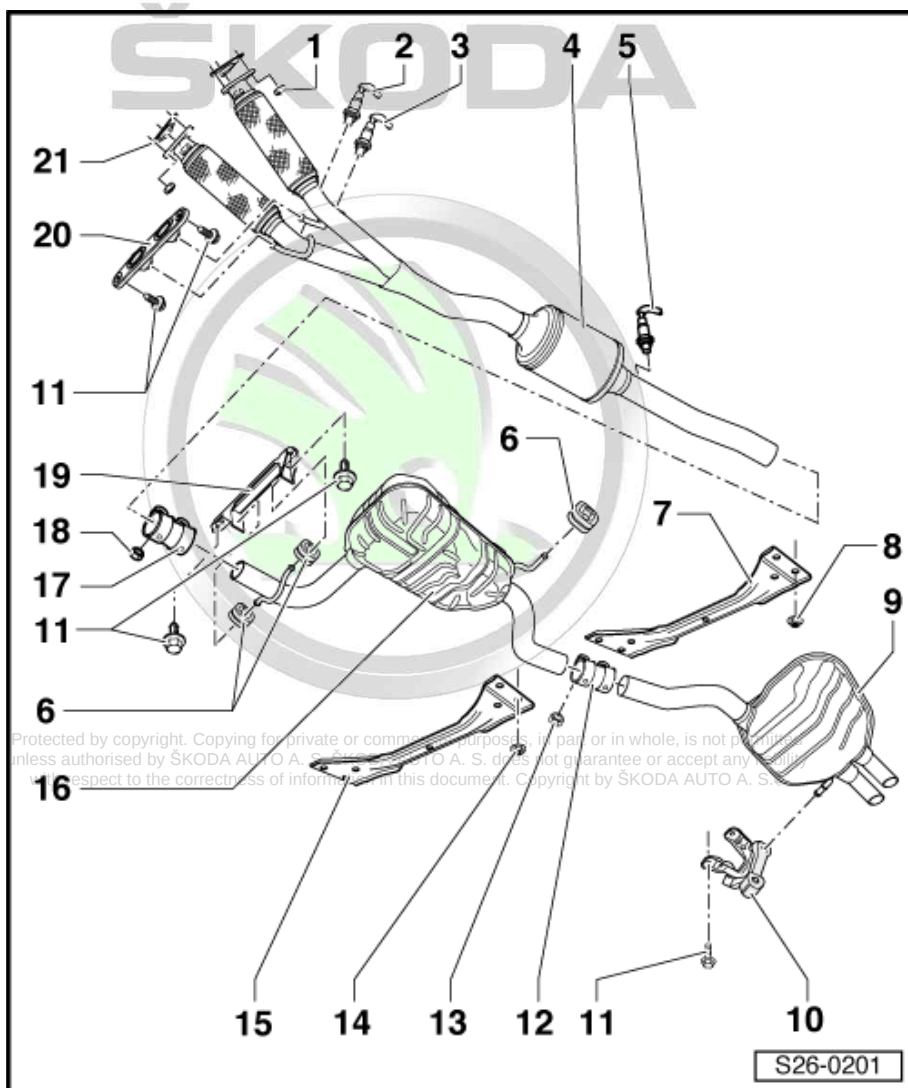
- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

### 2 - Lambda probe downstream of catalytic converter - G130- , 55 Nm

- ☐ Colour of the plug: black
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

### 3 - Lambda probe 2 downstream of catalytic converter - G131- , 55 Nm

- ☐ Colour of the plug: Brown
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body



### 4 - Exhaust pipe

- ☐ with catalytic converter
- ☐ protect against shocks and blows
- ☐ with balancing element
- ☐ do not twist decoupling element more than 10° - risk of damage
- ☐ removing and installing ⇒ [page 284](#)
- ☐ Align exhaust system free of stress ⇒ [page 289](#)

### 5 - Lambda probe 3 downstream of catalytic converter - G287- , 55 Nm

- ☐ Colour of the plug: black
- ☐ only grease the thread with hot bolt paste - G 052 112 A3- ; the paste must not get into the slot of the probe body

### 6 - Retaining strap

- ☐ replace if damaged



## 7 - Rear tunnel bridge

8 - 20 Nm

## 9 - Rear part of exhaust system

- ☐ as original equipment this is a single part with the middle part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

## 10 - Hanger

- ☐ replace if damaged

11 - 23 Nm

## 12 - Rear clamping sleeve

- ☐ for individually replacing front or rear silencer
- ☐ Fitting position ⇒ [page 288](#)
- ☐ Tighten screwed connections uniformly

13 - 23 Nm

14 - 20 Nm

## 15 - Front tunnel bridge

## 16 - Middle part of exhaust system

- ☐ as original equipment this is a single part with the rear part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

## 17 - Front clamping sleeve

- ☐ align exhaust system free of stress before fitting on ⇒ [page 289](#)
- ☐ Fitting position ⇒ [page 288](#)
- ☐ Tighten screwed connections uniformly

18 - 23 Nm

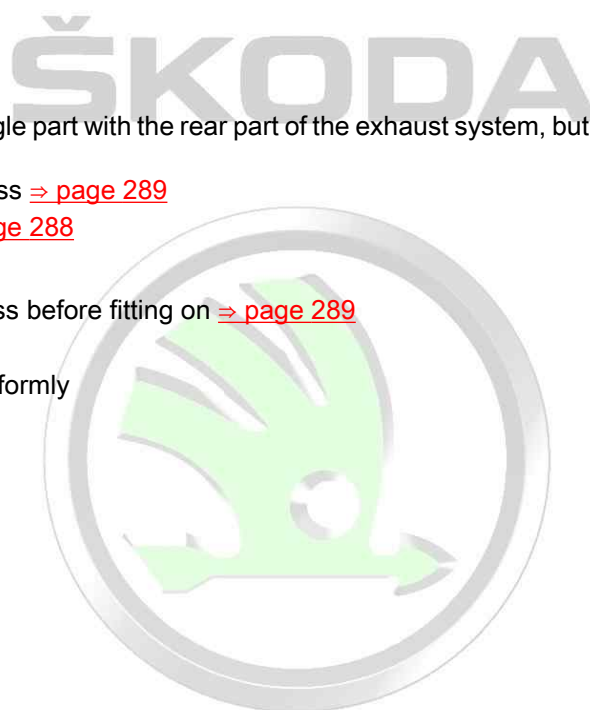
## 19 - Hanger

## 20 - Hanger

- ☐ replace if damaged

## 21 - Gasket

- ☐ replace



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## 1.3 Exhaust system - summary of components, vehicles with four-wheel drive (BLX, BVX)

### 1 - 25 Nm

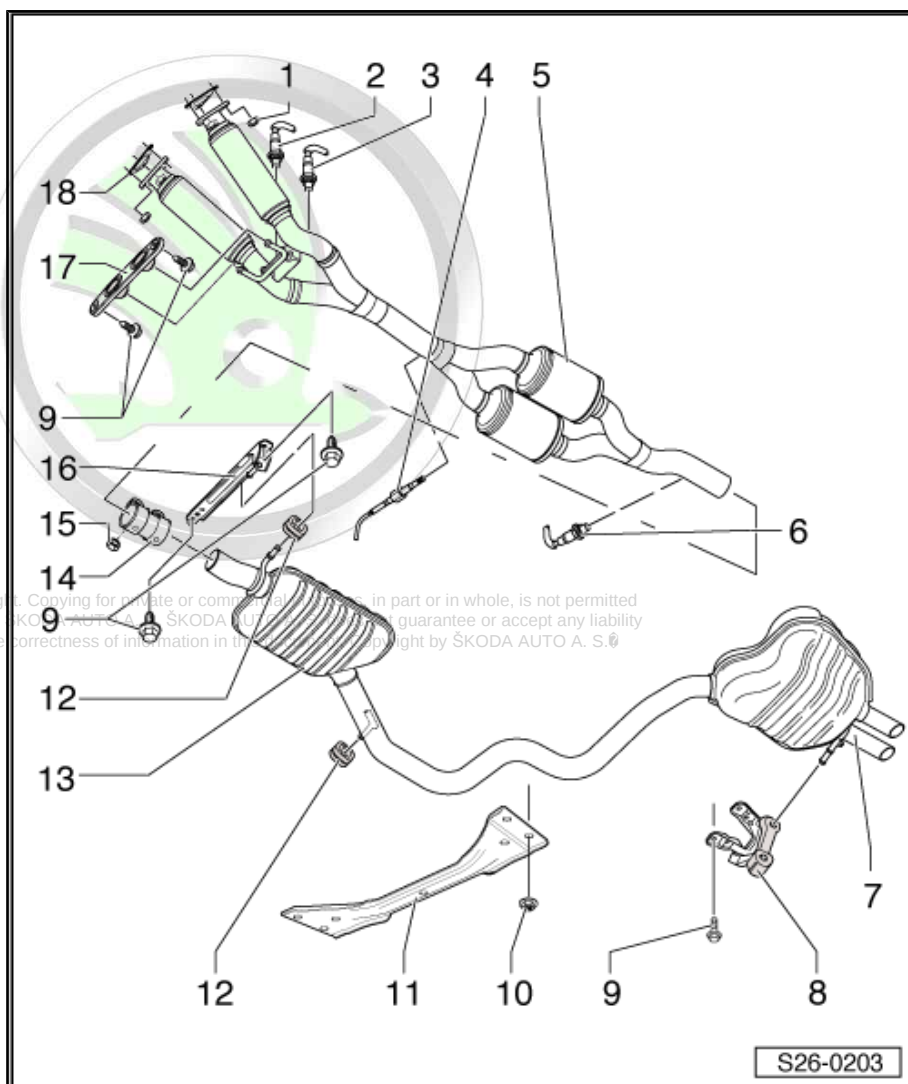
- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

### 2 - Lambda probe downstream of catalytic converter - G130- , 55 Nm

- ☐ Colour of the plug: black
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

### 3 - Lambda probe 2 downstream of catalytic converter - G131- , 55 Nm

- ☐ Colour of the plug: Brown
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body



### 4 - Exhaust gas temperature sender 1 - G235- , 45 Nm

- ☐ the thread of a new sender must be coated with assembly paste
- ☐ if sender is re-used, only grease the thread with hot bolt paste - G 052 112 A3-

### 5 - Exhaust pipe

- ☐ with NO<sub>x</sub> storage converter
- ☐ protect against shocks and blows
- ☐ with balancing element
- ☐ do not twist decoupling element more than 10° - risk of damage
- ☐ removing and installing ⇒ [page 284](#)
- ☐ Align exhaust system free of stress ⇒ [page 289](#)

### 6 - NOx sender - G295- , 55 Nm

- ☐ the thread of a new sender must be coated with assembly paste
- ☐ if sender is re-used, only grease the thread with hot bolt paste - G 052 112 A3-

### 7 - Rear part of exhaust system

- ☐ Align exhaust system free of stress ⇒ [page 289](#)

**8 - Hanger**

- ☐ replace if damaged

**9 - 23 Nm**

**10 - 20 Nm**

**11 - Rear tunnel bridge**

**12 - Retaining strap**

- ☐ replace if damaged

**13 - Middle part of exhaust system**

- ☐ Align exhaust system free of stress ⇒ [page 289](#)

**14 - Front clamping sleeve**

- ☐ align exhaust system free of stress before fitting on ⇒ [page 289](#)
- ☐ Fitting position ⇒ [page 288](#)
- ☐ Tighten screwed connections uniformly

**15 - 23 Nm**

**16 - Hanger**

**17 - Hanger**

- ☐ replace if damaged

**18 - Gasket**

- ☐ replace



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## 2 Exhaust system, engine identification characters BLY, BVZ - summary of components

Only vehicles with front-wheel drive

### 2.1 Exhaust manifold - summary of components

#### 1 - Gasket

- ☐ replace

#### 2 - Exhaust manifold

- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.
- ☐ removing and installing  
⇒ [page 281](#)

#### 3 - Protection plate

#### 4 - 10 Nm

#### 5 - 40 Nm

#### 6 - 25 Nm

#### 7 - Support for exhaust manifold

- ☐ right

#### 8 - Strut

- ☐ between the flanges

#### 9 - Gasket

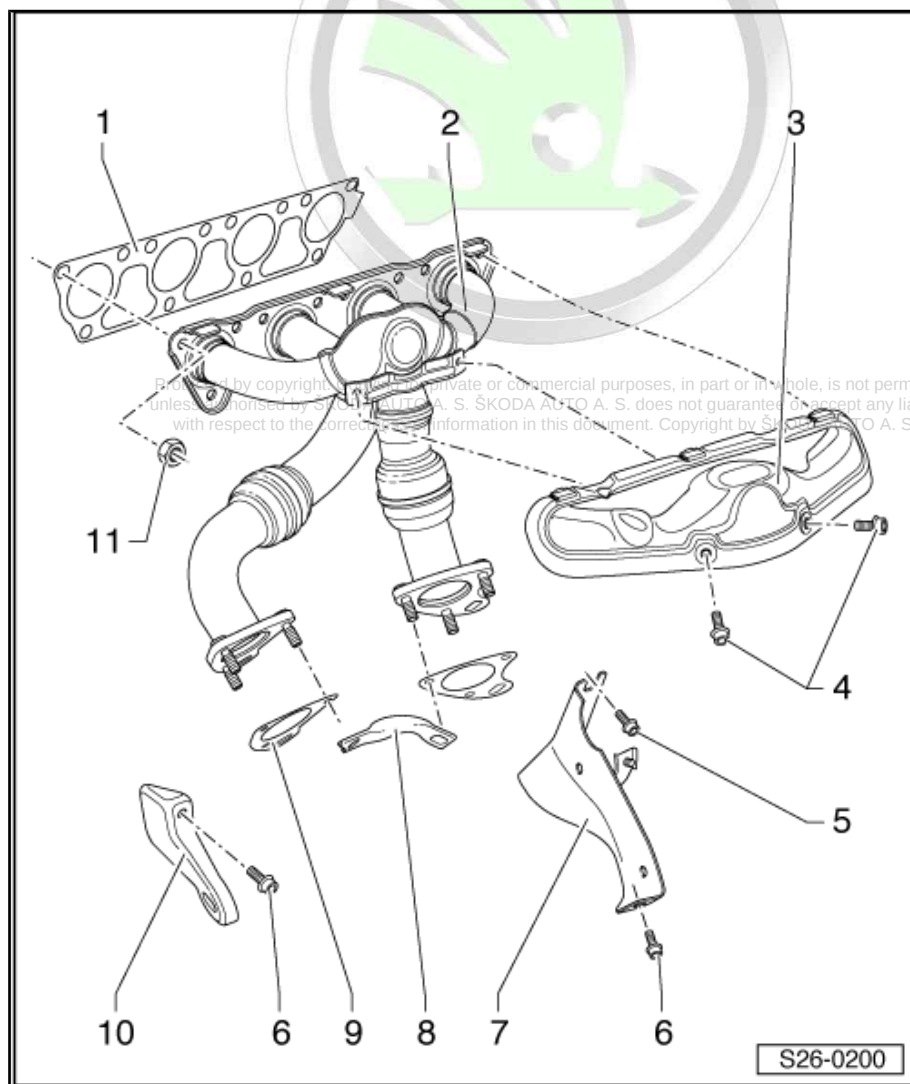
- ☐ replace

#### 10 - Support for exhaust manifold

- ☐ left

#### 11 - 25 Nm

- ☐ replace
- ☐ Coat stud bolts in the cylinder head with hot bolt paste - G 052 112 A3-



## 2.2 Exhaust gas system - Summary of components

### 1 - 25 Nm

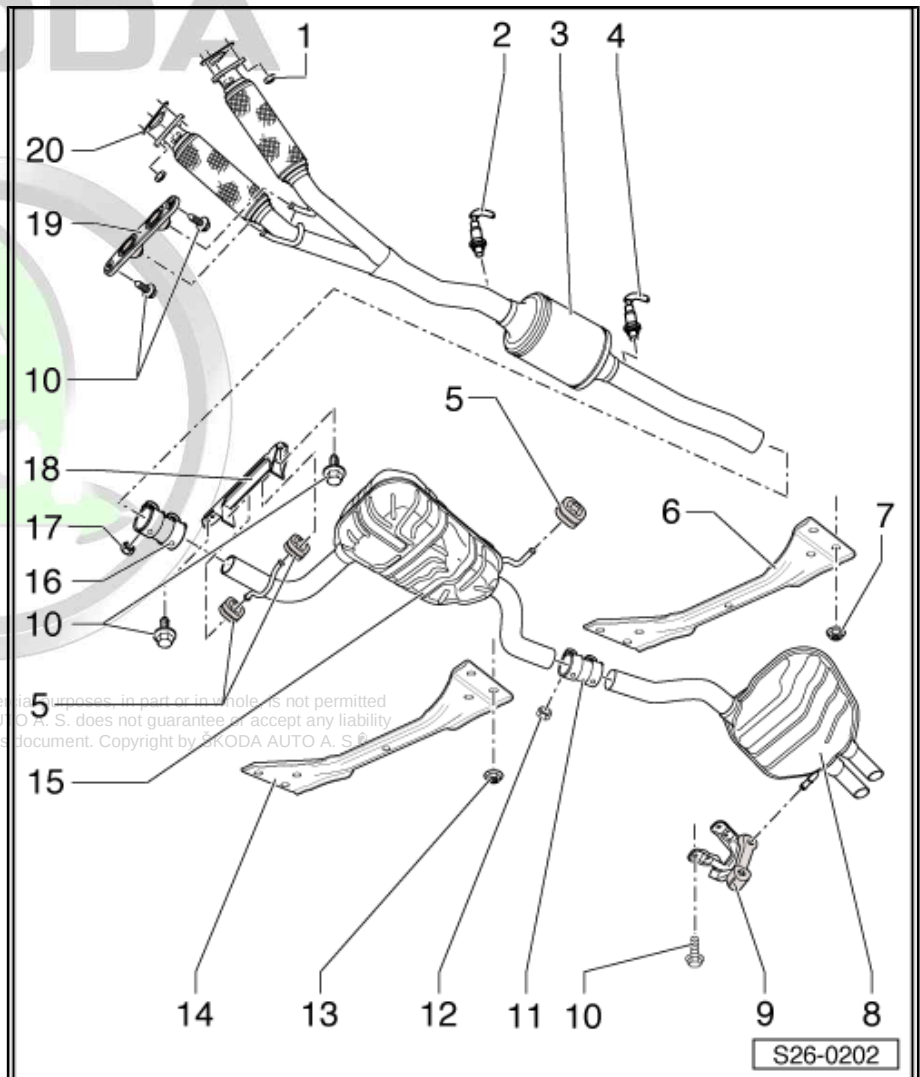
- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

### 2 - Lambda probe - G39- , 55 Nm

- ☐ Colour of the plug: Brown
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

### 3 - Exhaust pipe

- ☐ with catalytic converter
- ☐ protect against shocks and blows
- ☐ with balancing element
- ☐ do not twist decoupling element more than 10° - risk of damage
- ☐ removing and installing  
⇒ [page 284](#)
- ☐ Align exhaust system free of stress  
⇒ [page 289](#)



### 4 - Lambda probe downstream of catalytic converter - G130- , 55 Nm

- ☐ Colour of the plug: black
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

### 5 - Retaining strap

- ☐ replace if damaged

### 6 - Rear tunnel bridge

### 7 - 20 Nm

### 8 - Rear part of exhaust system

- ☐ as original equipment this is a single part with the middle part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

### 9 - Hanger

- ☐ replace if damaged





#### 10 - 23 Nm

#### 11 - Rear clamping sleeve

- ☐ for individually connecting middle or rear part of the exhaust system
- ☐ Fitting position ⇒ [page 288](#)
- ☐ Tighten screwed connections uniformly

#### 12 - 23 Nm

#### 13 - 20 Nm

#### 14 - Front tunnel bridge

#### 15 - Middle part of exhaust system

- ☐ as original equipment this is a single part with the rear part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

#### 16 - Front clamping sleeve

- ☐ align exhaust system free of stress before fitting on ⇒ [page 289](#)
- ☐ Fitting position ⇒ [page 288](#)
- ☐ Tighten screwed connections uniformly

#### 17 - 23 Nm

#### 18 - Hanger

#### 19 - Hanger

- ☐ replace if damaged

#### 20 - Gasket

- ☐ replace

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### 3 Exhaust system, engine identification characters BWA - summary of components

#### 3.1 Exhaust gas system - Summary of components

##### 1 - Gasket

- ☐ replace

##### 2 - Lambda probe - G39- , 55 Nm

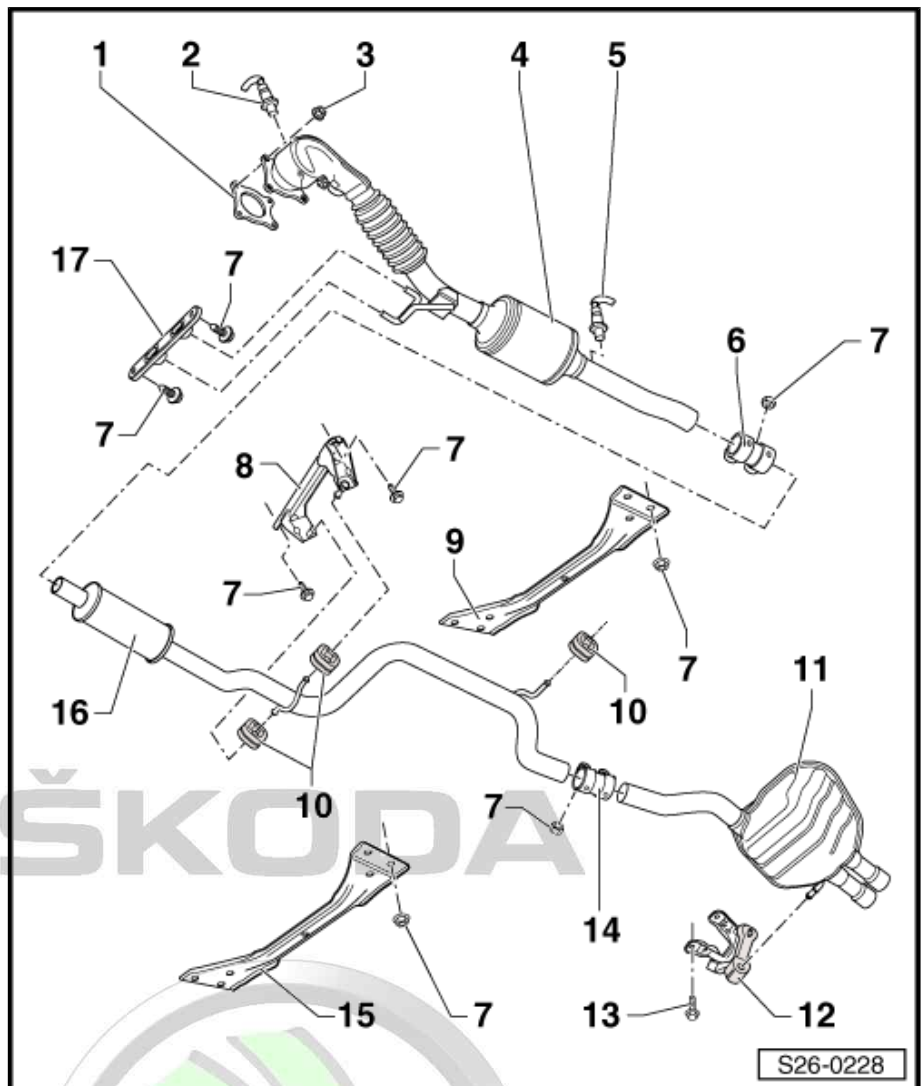
- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

##### 3 - 40 Nm

- ☐ replace
- ☐ Coat stud bolts of exhaust manifold with hot bolt paste - G 052 112 A3- before installing.

##### 4 - Exhaust pipe

- ☐ with catalytic converter
- ☐ protect against shocks and blows
- ☐ with balancing element
- ☐ do not twist decoupling element more than 10° - risk of damage
- ☐ removing and installing  
⇒ [page 286](#)
- ☐ Align exhaust system free of stress  
⇒ [page 289](#)



##### 5 - Lambda probe downstream of catalytic converter - G130- , 55 Nm

- ☐ the thread of new lambda probes must be coated with assembly paste
- ☐ for re-used lambda probe, only coat the thread with hot bolt paste - G 052 112 A3- ; the hot bolt paste - G 052 112 A3- must not get into the slots of the probe body

##### 6 - Front clamping sleeve

- ☐ align exhaust system free of stress before fitting on ⇒ [page 289](#)
- ☐ Fitting position ⇒ [page 289](#)
- ☐ Tighten screwed connections uniformly



**7 - 23 Nm**

**8 - Hanger**

**9 - Front tunnel bridge**

**10 - Retaining strap**

- ☐ replace if damaged

**11 - Rear part of exhaust system**

- ☐ as original equipment this is a single part with the middle part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

**12 - Hanger**

- ☐ replace if damaged

**13 - 23 Nm**

**14 - Rear clamping sleeve**

- ☐ for individually connecting middle or rear part of the exhaust system
- ☐ Fitting position ⇒ [page 289](#)
- ☐ Tighten screwed connections uniformly

**15 - Rear tunnel bridge**

**16 - Middle part of exhaust system**

- ☐ as original equipment this is a single part with the rear part of the exhaust system, but replace individually for repairs
- ☐ Align exhaust system free of stress ⇒ [page 289](#)
- ☐ odłączyć układ wydechowy ⇒ [page 288](#)

**17 - Hanger**

- ☐ replace if damaged



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## 4 Removing and installing parts of the exhaust system

### Note

- ◆ Vehicles with engine identification characters BLY and BVZ comply with the EU2 emission standard. On these vehicles, some exhaust components are not fitted, such as the exhaust gas recirculation system, control unit for NOx sender - J583-, lambda probe 2 - G108 - and lambda probe 2 downstream of catalytic converter - G131-. Take this into account during assembly/installation.
- ◆ Replace the gaskets and the self-locking nuts.
- ◆ After performing installation work on the exhaust system, make sure the exhaust system is not mounted under tension and has adequate clearance from the vehicle body. If necessary, loosen the clamping sleeve and align the front and middle parts of the exhaust system to create adequate clearance between these components and the vehicle body and to distribute the weight of the exhaust system uniformly across the mountings.

### 4.1 Removing and installing exhaust manifold, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

#### Special tools and workshop equipment required

- ◆ Ring spanner set for lambda probe
- ◆ Hot screw paste - G 052 112 A3-

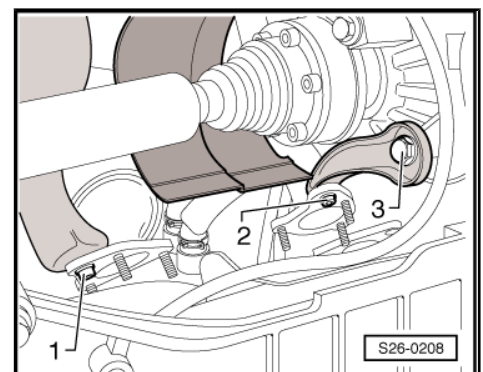
### Note

- ◆ The following steps describe how to remove all parts that may be installed.
- ◆ There may be fewer parts, depending on engine and drive type.

#### 4.1.1 Removing

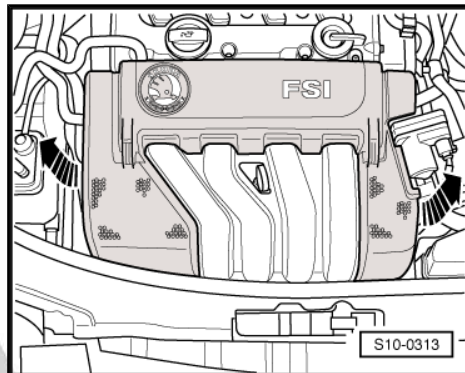
The exhaust manifold is removed upwards.

- Remove the sound dampening system ⇒ Body Work; Rep. gr. 50 .
- Remove pre-exhaust pipe ⇒ [page 284](#) .
- Unscrew bolts -1- to -3- of the supports for the exhaust manifold.

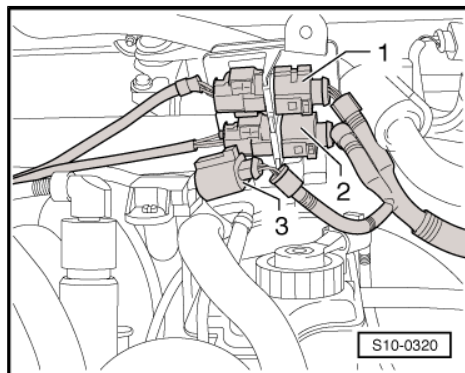




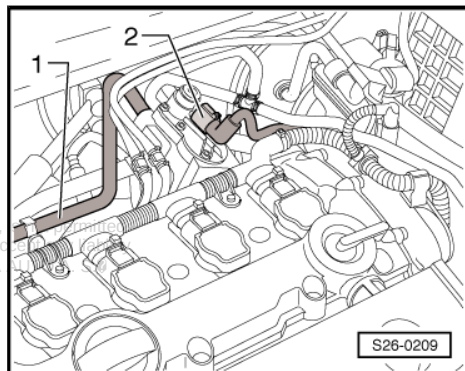
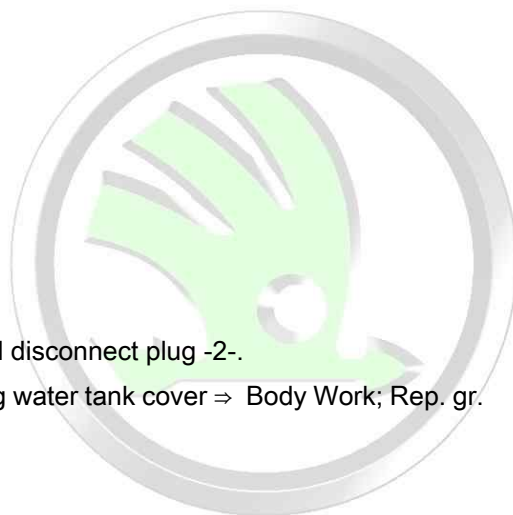
- Remove engine cover upwards -arrows-.



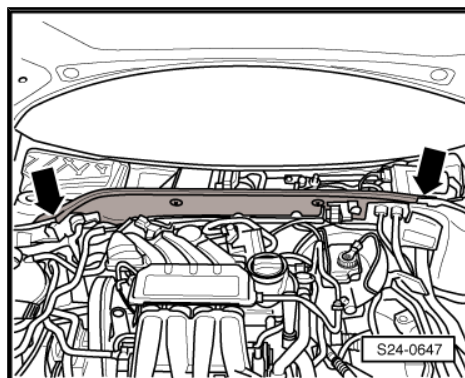
- Take plug connections -1- and -2- for lambda probes out of the bracket and disconnect.



- Unclip hose -1- and disconnect plug -2-.
- Remove the cooling water tank cover ⇒ Body Work; Rep. gr. 66 .



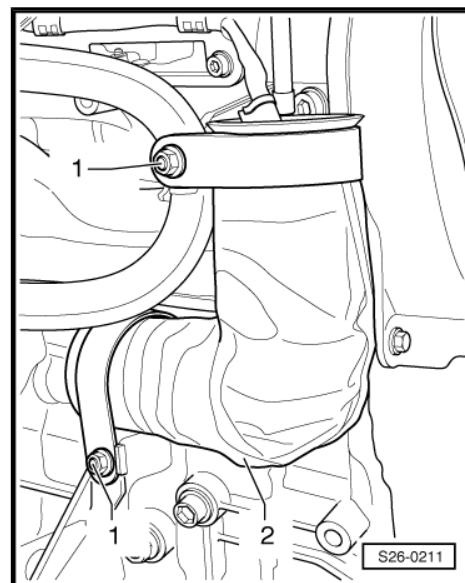
- Remove bulkhead plenum chamber -arrows-.



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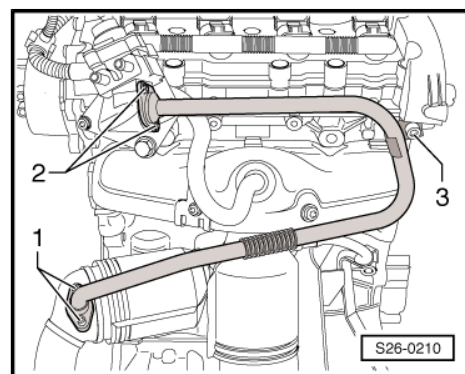


- Unscrew nuts -1- and remove cable guide -2-.

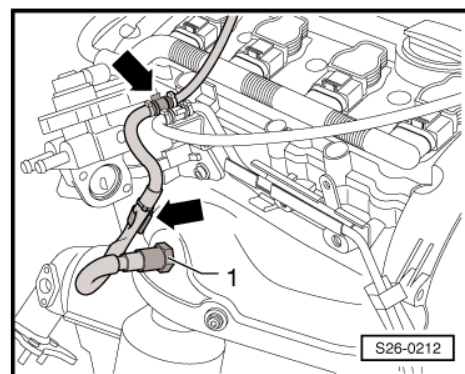


- Unscrew bolts -1- to -3- and remove the bottom connection pipe.
- Remove the top connection pipe ➔ [page 291](#) .

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- Move clear the electric cable of the lambda probe upstream of catalytic converter -arrows-
- Remove lambda probe upstream of catalytic converter -1-.



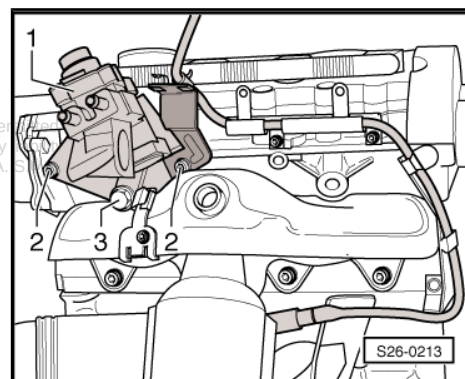
- Unscrew bolts -2- and -3- and swivel exhaust gas recirculation valve -1- to the side.



**Note**

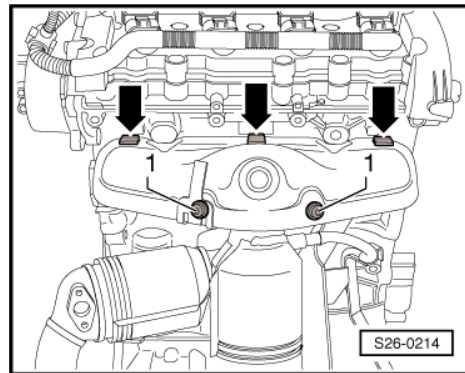
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*The coolant hoses of the exhaust gas recirculation valve stay connected.*



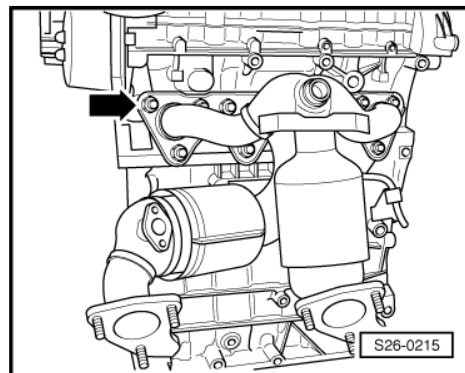


- Remove heat shield at exhaust manifold. Unscrew bolts -1- and remove heat shield -arrows-.



- Detach exhaust manifold -arrow- and remove upwards.

If the lambda probes are to be removed, use the lambda probe open ring spanner set .



#### 4.1.2 Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Fit all cable straps on again in the same place when installing.
- When performing installation work replace the self-locking nuts.
- Replace all the gaskets.
- The thread of the lambda probe must be greased with hot bolt paste - G 052 112 A3- . This paste must not come into contact with the slot of the probe body.

#### 4.2 Removing and installing front part of exhaust system, engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

##### Special tools and workshop equipment required

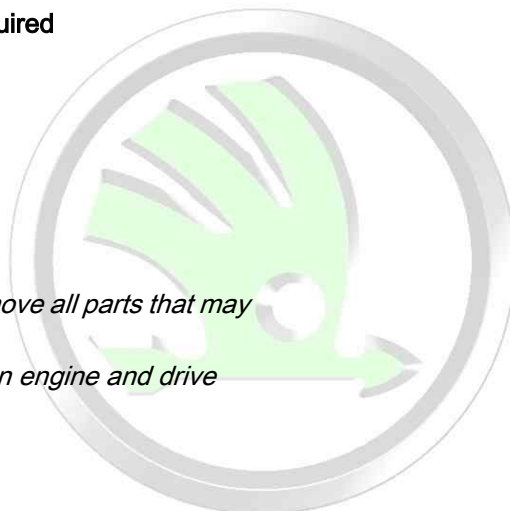
- ◆ Ring spanner set for lambda probe
- ◆ Hot screw paste - G 052 112 A3-

##### Removing

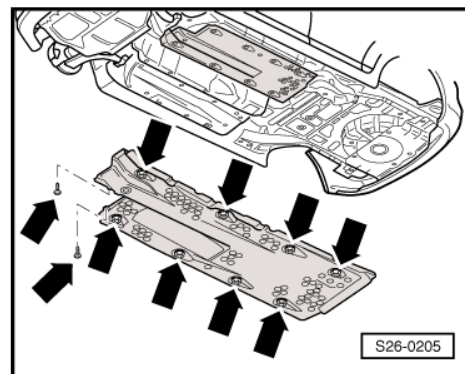


##### Note

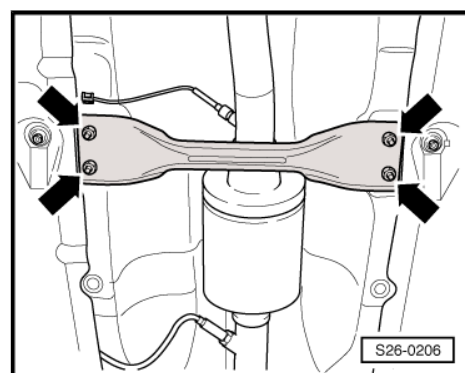
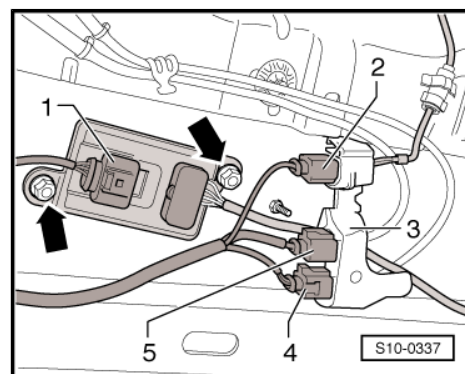
- ◆ *The following steps describe how to remove all parts that may be installed.*
- ◆ *There may be fewer parts, depending on engine and drive type.*



- Remove underbody cover -arrows-.



- Disconnect plug -1- from control unit for NOx sender - J583- .
- Remove the holder -3- from the underbody.
- Pull off plug -2- for exhaust gas temperature sender 1 - G235- and move the cable clear.
- Pull off plug (black) -4- for right lambda probe downstream of catalytic converter - G130- and move the cable clear.
- Pull off plug (brown) -5- for left lambda probe downstream of catalytic converter 2 - G131- and move the cable clear.
- Detach the control unit for NOx sender - J583- -arrows- and move the cable with control unit clear.
- Remove front tunnel bridge -arrows-.



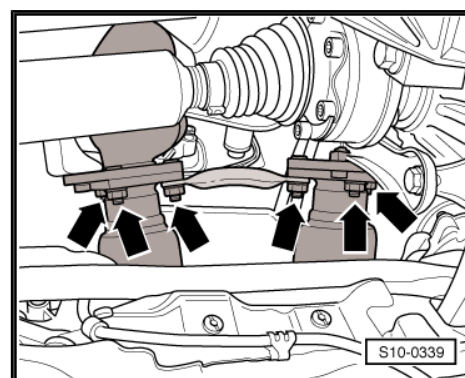
- Unscrew the securing nuts -arrows- of the front section of the exhaust system/exhaust manifold.



#### Note

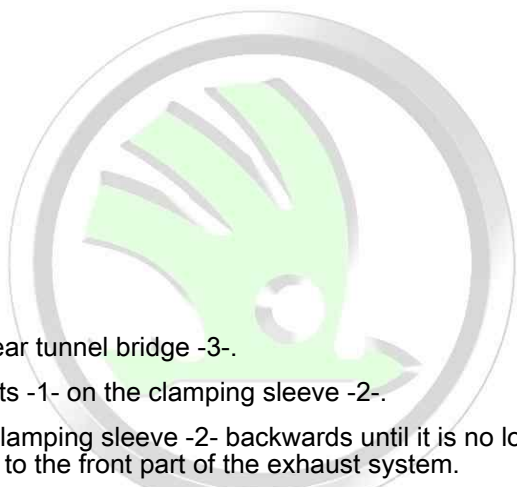
*The decoupling elements in the front section of the exhaust system should not be bent by more than 10° - risk of damage.*

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- Unbolt mounting for exhaust system -arrows-.



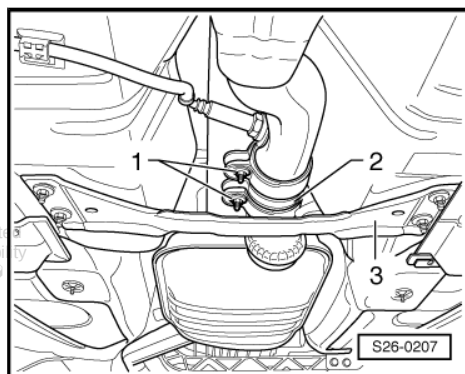
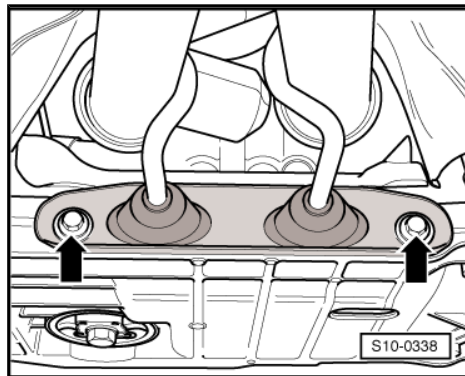
- Remove rear tunnel bridge -3-.
- Loosen nuts -1- on the clamping sleeve -2-.
- Push the clamping sleeve -2- backwards until it is no longer connected to the front part of the exhaust system.
- Remove the front part of the exhaust system.

If the lambda probes are to be removed, use the lambda probe open ring spanner set.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace the gaskets and the self-locking nuts.
- Align exhaust system free of stress ⇒ [page 289](#) .
- Coat studs of the exhaust manifold with hot bolt paste - G 052 112 A3- .



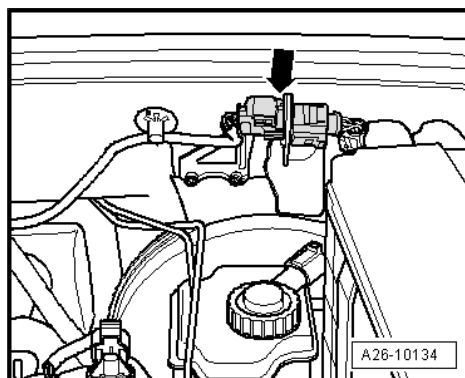
### 4.3 Removing and installing front part of exhaust system, engine identification characters BWA

#### Special tools and workshop equipment required

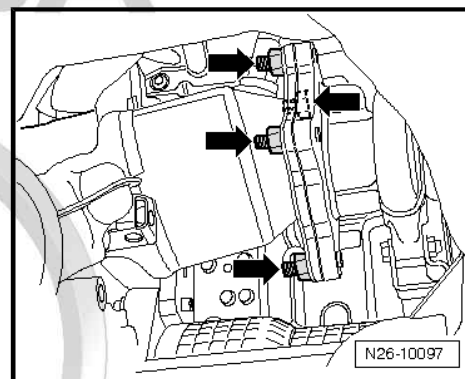
- ◆ Ring spanner set for lambda probe
- ◆ Hot screw paste - G 052 112 A3-

#### Removing

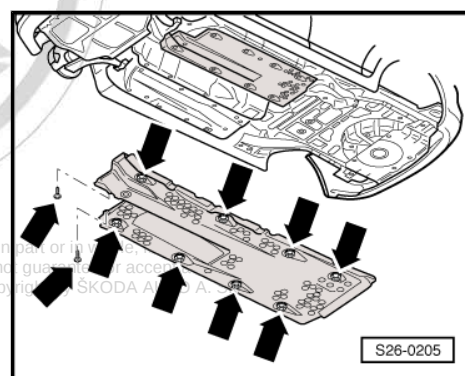
- Remove engine cover ⇒ [page 242](#) .
- Take plug connection -arrow- for lambda probe upstream of catalytic converter out of the holder, disconnect and move wiring loom clear.



- Unscrew the two top securing nuts -arrows- of the front part of the exhaust system/exhaust gas turbocharger.



- Remove underbody cover on right -arrows-.

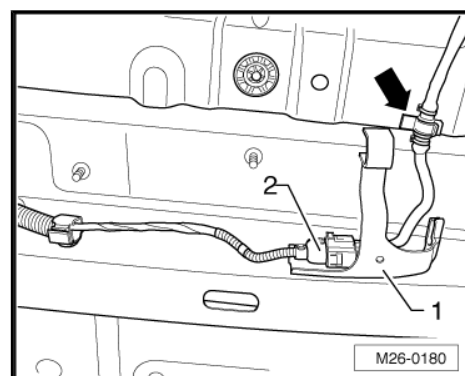


- Unclip the cable -arrow-, remove the mounting bracket -1- and disconnect the plug connection -2- for the lambda probe downstream of catalytic converter - G130- .

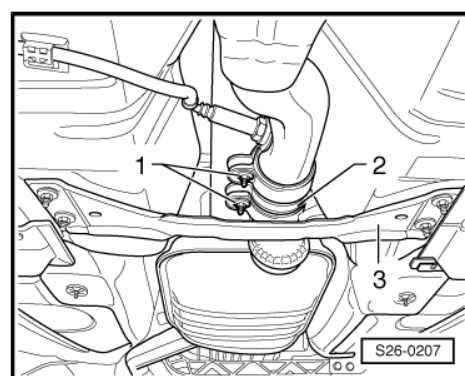


#### Note

*The decoupling elements in the front section of the exhaust system should not be bent by more than 10° - risk of damage.*



- Separate exhaust system at the clamping sleeve -2-.





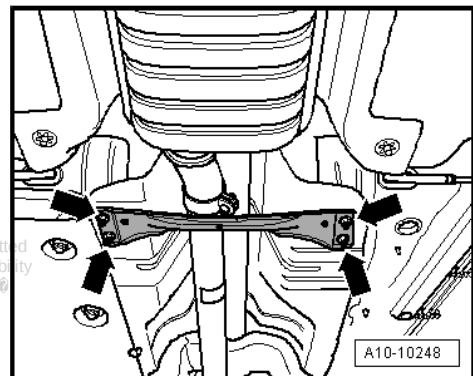
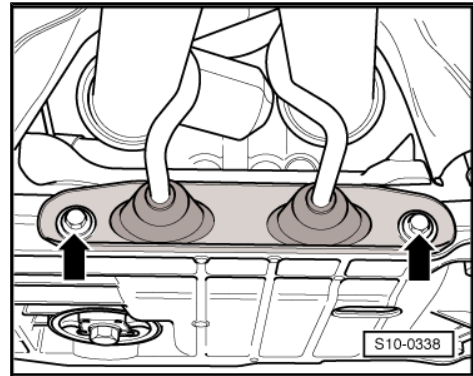


- Unbolt mounting for exhaust system -arrows-.



- Remove front tunnel bridge -arrows-.

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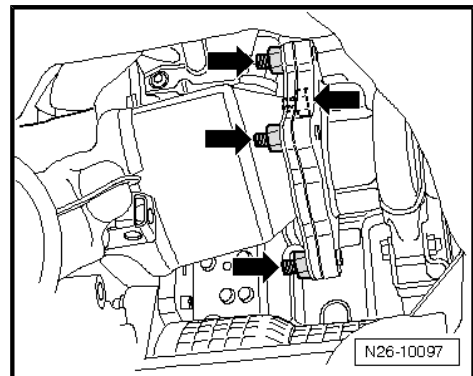


- Unscrew the two bottom securing nuts -arrows- of the front part of the exhaust system/exhaust gas turbocharger.
- Remove the front part of the exhaust system.

#### Install

Installation is carried out in the reverse sequence. Pay attention to the following:

- Replace the gaskets and the self-locking nuts.
- Align exhaust system free of stress ⇒ [page 289](#) .
- Coat studs of the exhaust manifold with hot bolt paste - G 052 112 A3- .



## 4.4 Replacing the middle and, if applicable, rear part of the exhaust system, only vehicles with front-wheel drive

#### Special tools and workshop equipment required

- ◆ Body saw e.g. -V.A.G 1523 A-
- ◆ Protective goggles



#### Note

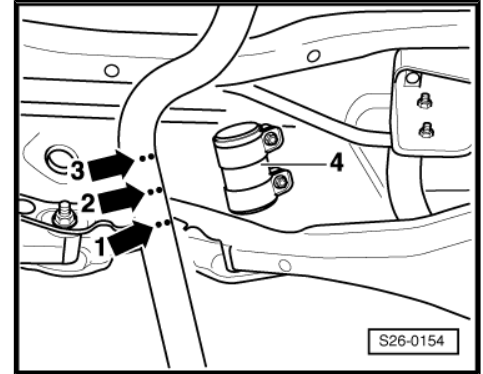
- ◆ For individually replacing the middle or rear part of the exhaust system, a separation point is provided in the connecting pipe.
- ◆ The separation point is marked by indentations on the circumference of the exhaust pipe.



## WARNING

*In order to avoid injuries because of metal swarfs, wear safety goggles and safety clothing.*

- Cut exhaust pipe at right angles at the separation point -arrow 2-.
- When installing, position rear clamping sleeve -4- at the side markings -arrow 1- and -arrow 3-.
- Turn the rear clamping sleeve -4- in such a way that the ends of the screws are as far upwards as possible.
- Align rear part of exhaust system horizontally and tighten rear clamping sleeve -4- to 23 Nm.
- Align exhaust system in cold condition free of stress  
⇒ [page 289](#).



## 4.5 Aligning exhaust system free of stress

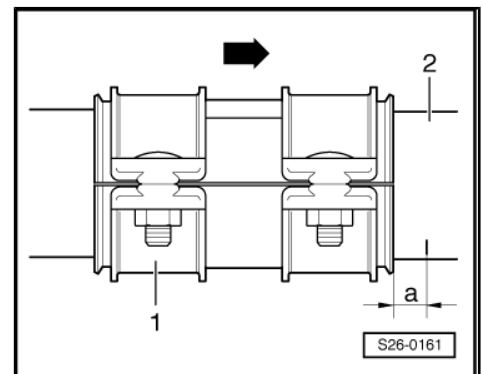
- The exhaust system is aligned when cold.
- Loosen front clamping sleeve -1- and align front part of exhaust system -2- (-arrow- points in direction of travel).  
-a- = 5 mm

The fixing screws must be located on the right. They must not protrude beyond the bottom edge of the double clamp.

- Tighten front nut by hand.

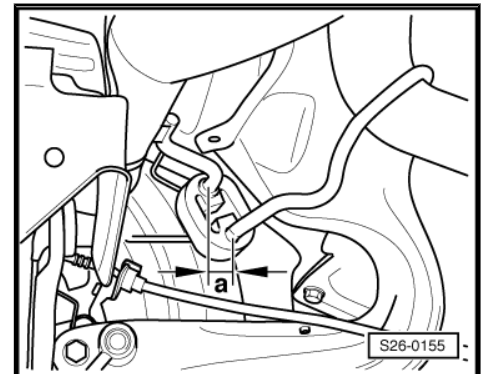
### Vehicles with front-wheel drive

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- Push the exhaust system forward until -dimension a- on the retaining strap on the front silencer is 9-11 mm.

### Vehicles with four-wheel drive



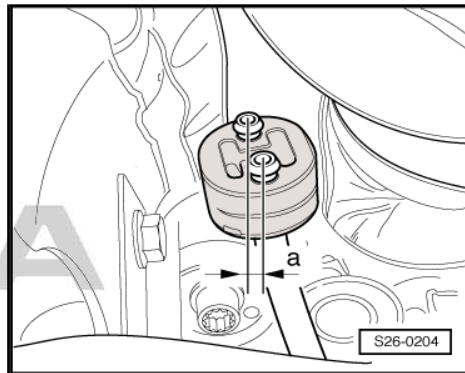


- Push the exhaust system forward until -dimension a- on the retaining strap on the front silencer is 7-9 mm.

#### Continued for all vehicles

- Tighten bolts of the front clamping sleeve uniformly to 23 Nm.

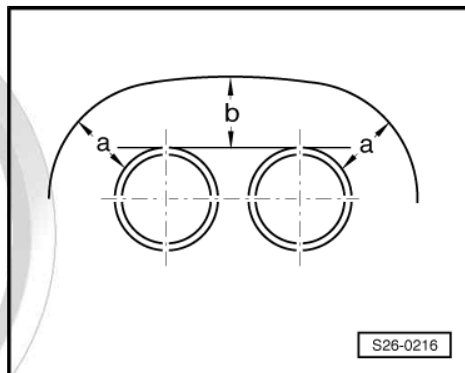
#### Align exhaust tailpipes



- Align rear part of exhaust system in such a way that there is an equal distance -a- on the left and right between bumper opening and exhaust tailpipes.

At the same time there must be an equal distance -b- from the bumper opening to the exhaust tailpipes.

For aligning, if necessary the hangers of the exhaust system must be loosened.



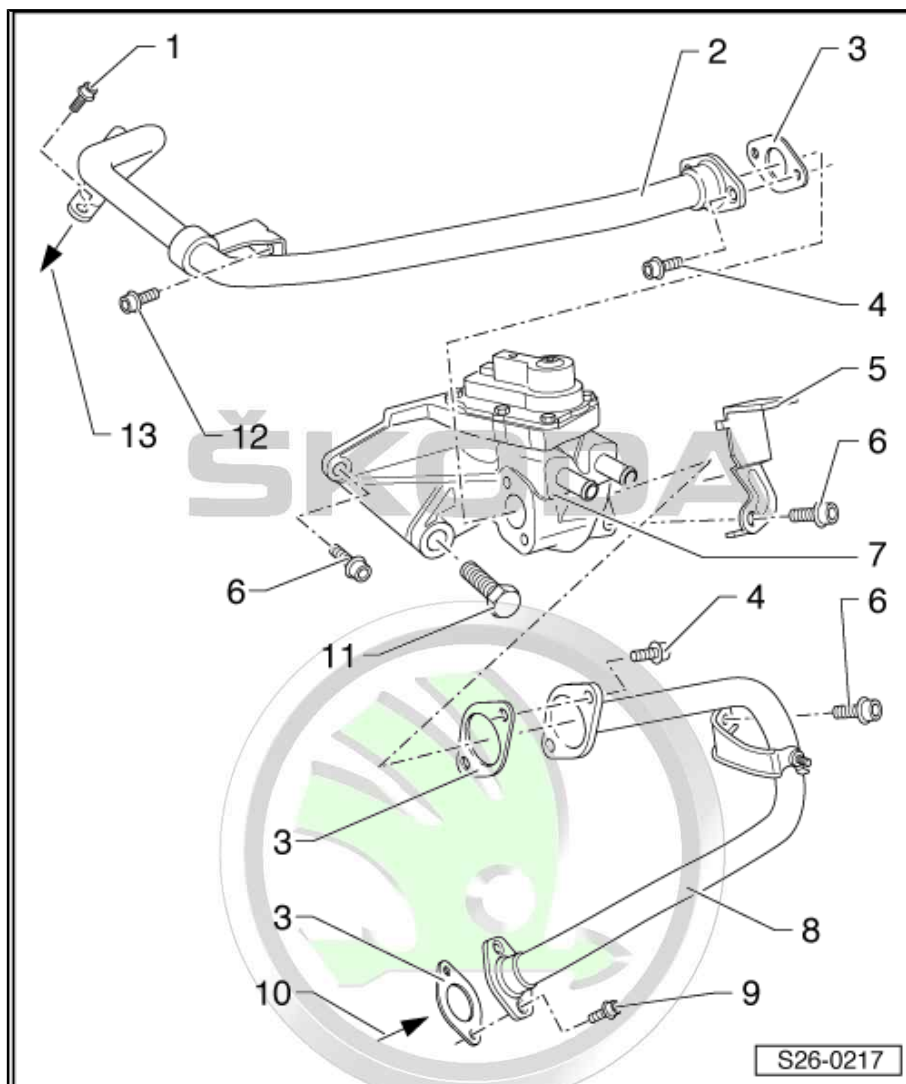
## 4.6 Inspecting the exhaust system for leak tightness

- Start engine and run in idle.
- Seal off exhaust tailpipes for the duration of the leak check (e.g. with cloth or plug).
- Inspect all the connection points (cylinder head/exhaust manifold, exhaust manifold/front part of exhaust system, etc.) for leak tightness by listening and visual inspection.
- Eliminate any leak found.

## 5 Exhaust gas recirculation system, engine identification characters BLR, BLX, BVY, BVX

### 5.1 Summary of components

- 1 - 10 Nm
  - ❑ note different length compared to Pos. 4
- 2 - Top connection pipe
  - ❑ removing and installing  
⇒ [page 291](#)
- 3 - Gasket
  - ❑ replace
- 4 - 10 Nm
  - ❑ note different length compared to Pos. 1
- 5 - Support
- 6 - 15 Nm
- 7 - Exhaust gas return valve - N18-
  - ❑ with EGR potentiometer - G212-
  - ❑ When replacing, adapt the engine control unit  
⇒ Vehicle diagnostic tester
- 8 - Bottom connection pipe
- 9 - 15 Nm
- 10 - from exhaust manifold
- 11 - 25 Nm
- 12 - 10 Nm
- 13 - To intake manifold



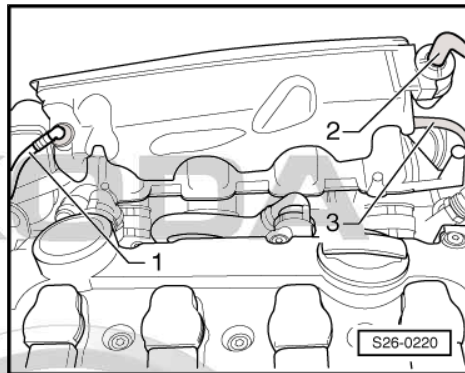
### 5.2 Removing and installing connection pipe for exhaust gas recirculation

#### Removing

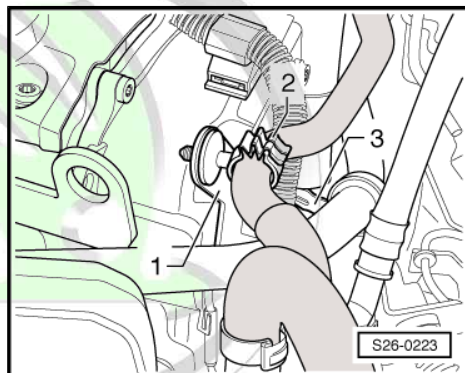
- Remove engine cover.
- Pull vacuum reservoir off intake manifold.



- Disconnect the vacuum line -1- from the vacuum reservoir and place the vacuum reservoir to one side.



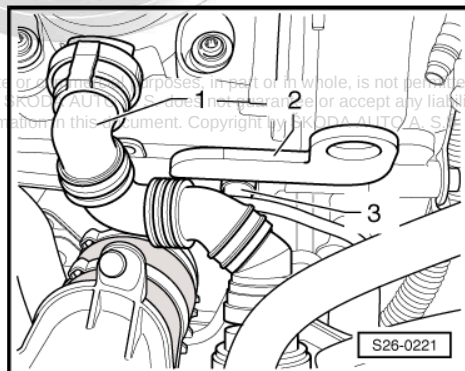
- Unhook coolant hose from the mounting -2-.
- Unbolt mounting bracket -3- from the top connection pipe on the housing with valve for camshaft control.
- Remove mounting bracket -1- from the housing with valve for camshaft control.



- Remove the hose for crankcase ventilation -1-.

- Remove lifting eye -2-. Unscrew bolt -3- to do so.

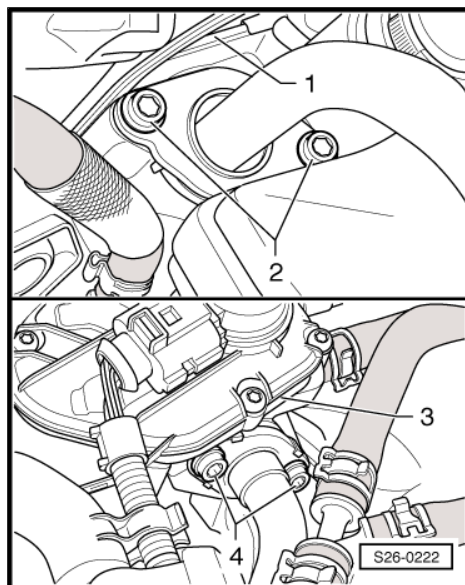
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- Unscrew bolts -2- from the top connection pipe on the intake manifold -1-.
- Unscrew bolts -4- from the connection pipe on the exhaust gas recirculation valve - N18- -3-.
- Pull out connection pipe to top front.

### Install

Installation occurs in reverse order to removal.





## 28 – Glow plug system

### 1 Ignition system

#### 1.1 Summary of components

**1 - Knock sensor 1 - G61-**

- ☐ Gold-plated contacts.

**2 - Ignition coil with a power output stage - (N70, N127, N291, N292)-**

- ☐ removing and installing  
⇒ [page 293](#)

**3 - Knock sensor 2 - G66-**

- ☐ Gold-plated contacts.
- ☐ for engine identification characters BWA, knock sensor 2 - G66- with wiring harness and plug connection, as Pos. 1

**4 - 20 Nm**

- ☐ The tightening torque influences the knock sensor function

**5 - Spark plug, 25 Nm**

- ☐ Type and electrode gap  
⇒ Maintenance ; Booklet Octavia II .
- ☐ use spark plug wrench  
e.g. -3122 B- for removing and installing

**6 - 10 Nm**

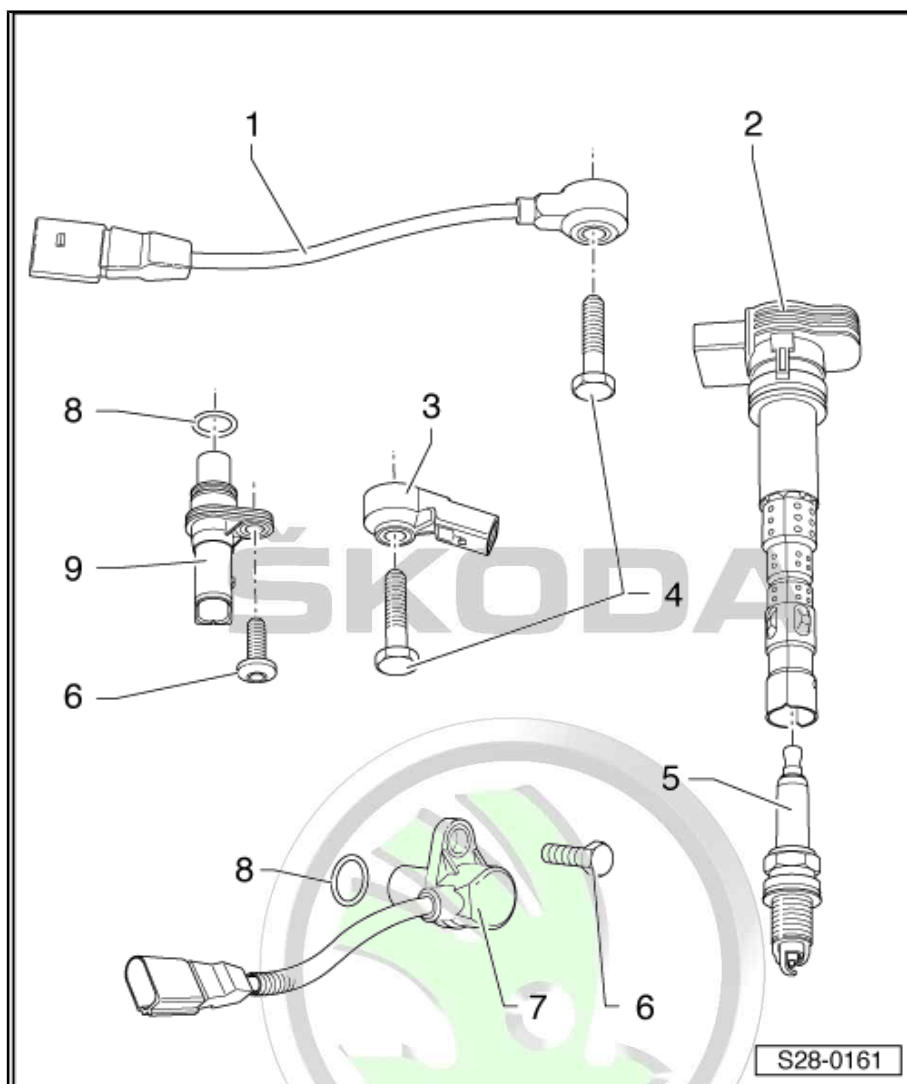
**7 - Engine speed sender - G28-**

**8 - O-ring**

- ☐ replace

**9 - Hall sender - G40-**

- ☐ Gold-plated contacts.



#### 1.2 Removing and installing ignition coils with output stage

**Special tools and workshop equipment required**

- ◆ Extractor - T40039-

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## Removing

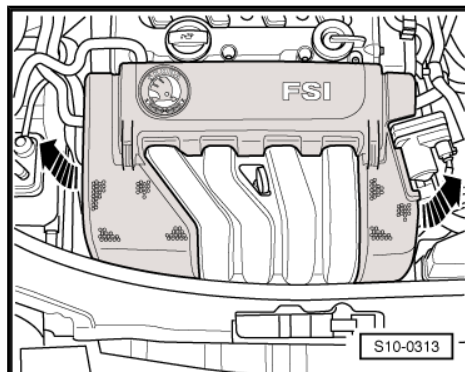
Vehicles with engine identification characters BLR, BLX, BLY, BVX, BVY, BVZ

- Pull off engine cover upwards at the sides -arrows-.

Vehicles with engine identification characters BWA

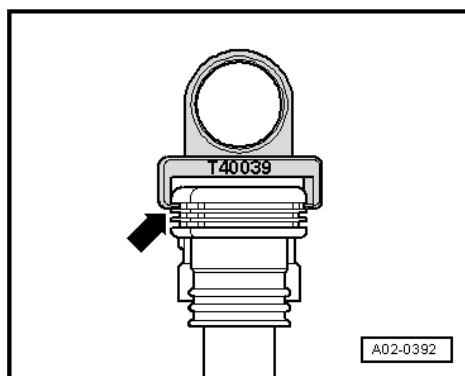
- Remove engine cover ⇒ [page 242](#) .

Continued for all vehicles

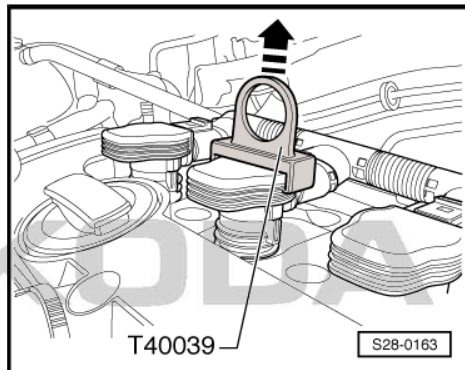


## Note

- ◆ To remove the spark plugs, attach the extractor - T40039- to the uppermost thick rib -arrow- of the ignition coil with power outage stage.
- ◆ If the lower ribs are used, they can be damaged.



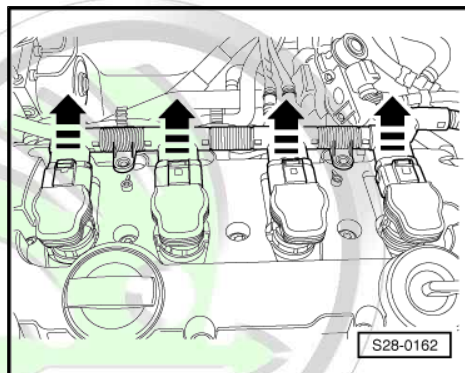
- Use the puller - T40039- to remove all ignition coils from the spark plug shaft only approx. 30 mm.



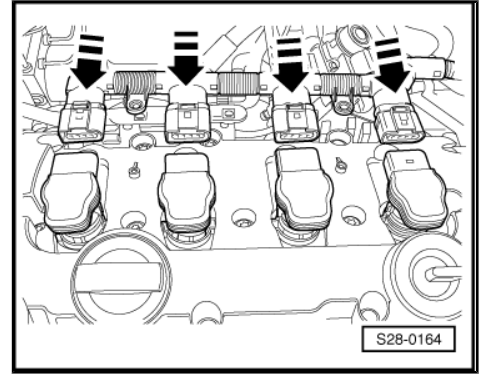
- Unlock the plugs and then pull all plugs off the ignition coils at the same time -arrows-.

## Install

- Insert all ignition coils loosely into the spark plug wrenches.



- Insert all connectors onto the ignition coils at the same time.
- Align ignition coils with the recesses in the cylinder head cover.
- Press ignition coils onto the spark plugs evenly by hand.



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